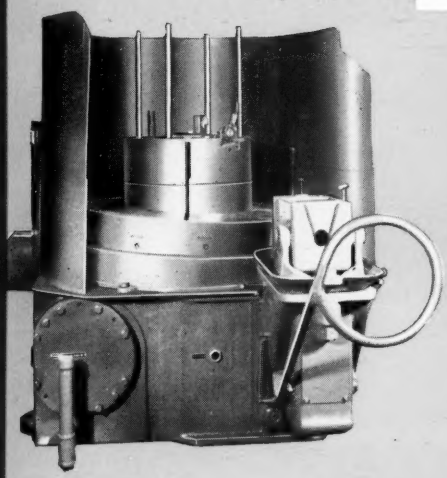
MARCH 1954

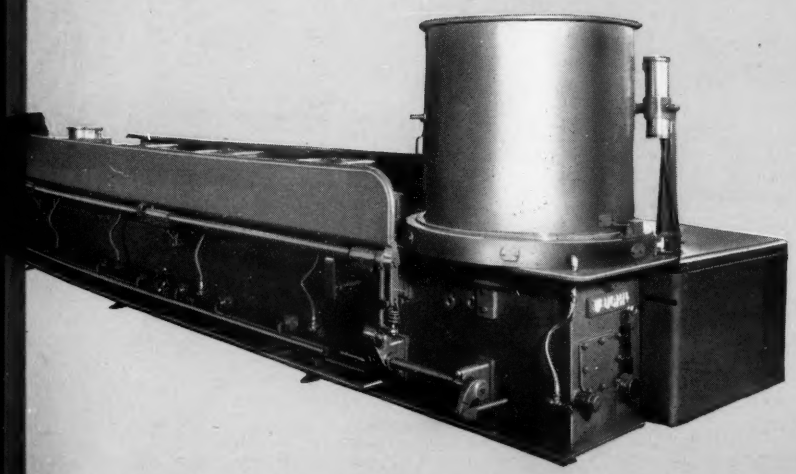
WIRE AND WIRE PRODUCTS



Wherever the Question is Greater Wire Production

—*the answer is*

Vaughn® Motobloc® and Motoblox®



Always in step with the needs of the industry, Vaughn Motobloc and Motoblox *each year* incorporate the latest and best in Vaughn design—Vaughn construction—Vaughn long life in service. Tell us your requirements.

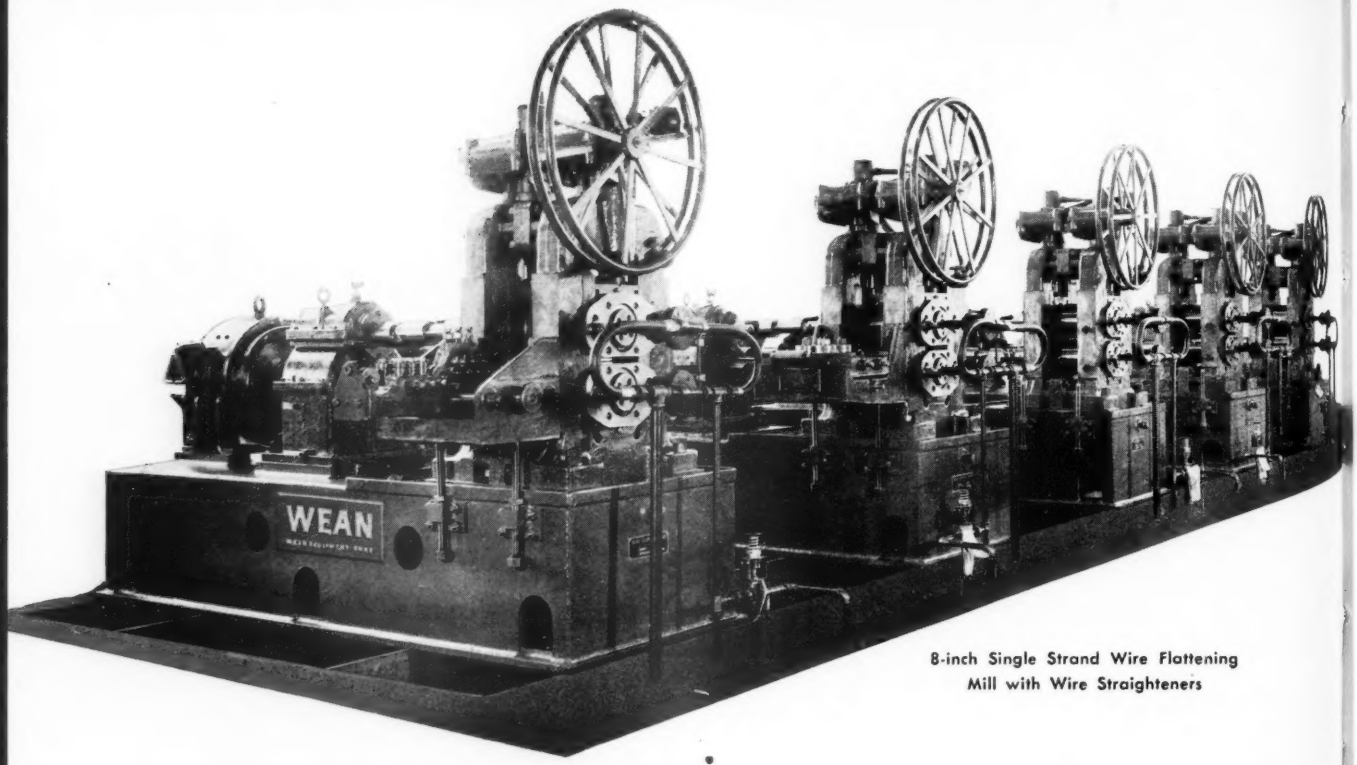
THE VAUGHN MACHINERY CO.
CUYAHOGA FALLS, OHIO, U.S.A.

COMPLETE COLD DRAWING EQUIPMENT—Continuous or Single Hole . . . for the Largest Bars & Tubes . . . for the Smallest Wire . . . Ferrous, Non-Ferrous Materials or their Alloys.

"Quick on the Draw"

OFFICIAL PUBLICATION OF THE WIRE ASSOCIATION

Wean



8-inch Single Strand Wire Flattening Mill with Wire Straighteners

A COMPLETE ENGINEERING SERVICE FOR WIRE MILL INSTALLATIONS

Complete Installations for Electro Galvanizing, Hot Dip Galvanizing, Patenting, Tinning, Wire Flattening, Nail Galvanizing and Blueing.

Complete Equipment for the Manufacture of Hexagon Netting, Hinge Joint Fence and Barbed Wire.

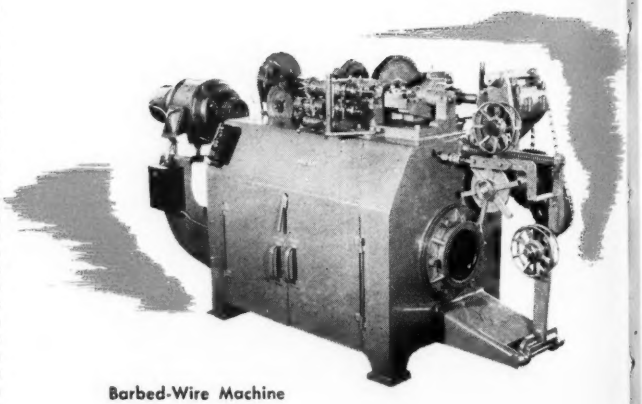
CHECK WEAN FIRST FOR WIRE MILL EQUIPMENT

STRIP MACHINERY

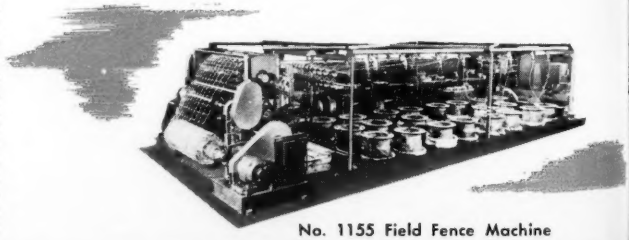
Slitting Installations. Cut to Length Installations. Bearing Metal Coating Installations. Two-Hi Rolling Mill Applications. Strip Grinding Installations. Levelers, Uncoilers, Pinch Rolls, Shears for Strip Processing lines.

WEAN EQUIPMENT CORPORATION

22800 LAKELAND BLVD. • CLEVELAND, OHIO



Barbed-Wire Machine



No. 1155 Field Fence Machine

Wean Equipment Corporation

CLEVELAND, OHIO

WHAT DOES FIRTH STERLING OFFER YOU?

(ANSWER NUMBER 3)

UNBIASED RECOMMENDATIONS

Producing *tools* and *tool materials* for the cutting, shaping and forming of metals is *major* business at Firth Sterling. Hence, capacity to serve you best necessarily embraces "full line tooling" . . . high speed tool steels *and* tungsten carbides, or *both* as needed.

So, you can count on *unbiased* tooling recommendations when you make Firth Sterling your *one* source of supply for *complete* shop tooling needs. We have no axes to grind!

What are the advantages to you?

1. An integrated tooling program that saves you money by matching tools to applications, without temptation to apply more expensive tools than may be necessary.
2. Improved production from wider selections. A choice of 97 different grades of high speed steels and tool and die steels *and* a dozen grades of carbides in everything from die nibs to an almost unlimited selection of standard and special carbide tools and tips.
3. The purchasing economies inherent to buying from one source of supply instead of from several.
4. The finest "packaged" tool line today for easy handling, stocking, identification in the tool crib, and inventory control.
5. The consistently high quality assured by 64 years of leadership in development of special purpose steels and 24 years of pioneering in carbide and powder metallurgy applications.

Makes sense, doesn't it? Call a Firth Sterling representative.

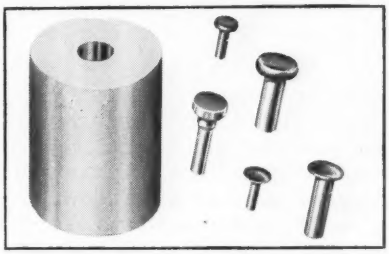
Firth Sterling Stands for Metallurgical Achievement—Past, Present, Future

I-3

DIE SPECIALISTS to the WIRE INDUSTRY

A COMPLETE LINE . . . CARBIDE AND STEEL

Firth Sterling offers wire manufacturers and fabricators the advantages of a *single* source of supply of materials for both tungsten carbide and tool steel drawing, shaping, forming and heading dies. This *complete* line, from famous Firthaloy, for maximum performance where carbide is a requirement, through almost one hundred grades of high speed and tool steels for cut-off knives, roll guides, die casings,

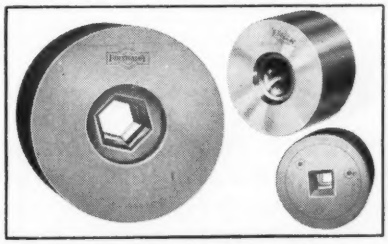


Carbide or steel heading dies—choose from the *complete* line which material best suits your needs.

forming rolls and similar applications, saves you time and money.

Standard items are available from warehouse stocks; others may be obtained from your local tool and diemaker.

Firth Sterling representatives are skilled in interpreting the needs of the wire industry and in suggesting the exactly right



Round, square, hex or specials—in carbide or steel as drawing requirements may indicate.

steel or carbide for specific applications. Because they know and sell both, you can depend on their unbiased recommendations to result in better, more economical tooling.

P-4

Firth Sterling

—INC—

GENERAL OFFICES: 3113 FORBES ST., PITTSBURGH 30, PA.

OFFICES* AND WAREHOUSES: BIRMINGHAM* CHICAGO CLEVELAND DAYTON* DETROIT HARTFORD HOUSTON* LOS ANGELES NEW YORK* PHILADELPHIA* PITTSBURGH* WASHINGTON* WESTFIELD, N.J.*

PRODUCTS OF FIRTH STERLING METALLURGY

High Speed Steels
Tool & Die Steels
Stainless Specialties
High Temperature Alloys
Sintered Tungsten Carbides
Firth Heavy Metal
Chromium Carbides
High Temperature Cermets

Fastest Process Annealing FOR COILED STEEL WIRE

- ✓ Annealing cycles accomplished in minutes rather than in hours
- ✓ 50% lower equipment cost
- ✓ less floor space
- ✓ no scale, decarburization, or other atmosphere effects

On-the-job production figures prove that no other method compares with an Ajax Electric Salt Bath Furnace in speed, uniformity, cost saving, and general all-around efficiency in process annealing all types of steel wire as well as aluminum, copper alloys, and silver alloys.

Heating cycles are far faster. Absolute uniformity is assured. Thanks to the exclusive Ajax electrodynamic stirring action, the temperature does not vary more than ±5°F. *in any part of the bath.*

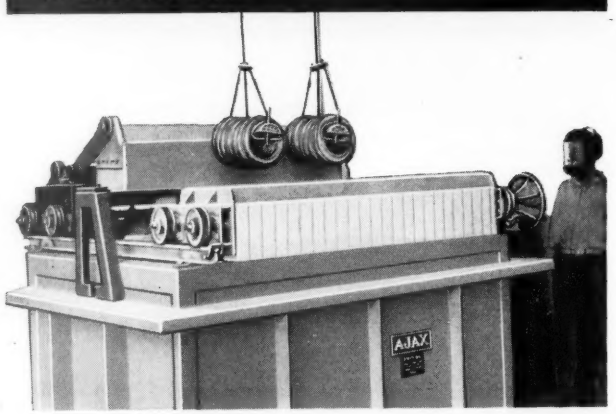
The Ajax Salt Bath eliminates all atmosphere with its accompanying problems of oxidation, pitting, and decarburization. Preservation of metal surface is assured. Equipment cost is much lower —and the Ajax handles more work for a given amount of floor space than any other method. Ajax Reprints 62 and 63 gladly sent on request.

LOW- AND HIGH-CARBON STEELS

This typical Ajax installation process anneals 1200 lb. 18-gauge wire an hour in only 58 feet of floor space.

STAINLESS STEEL

Annealing fine gauge nickel-chromium wire at 1950°F. Clean wire surface eliminates conventional pickling operations.



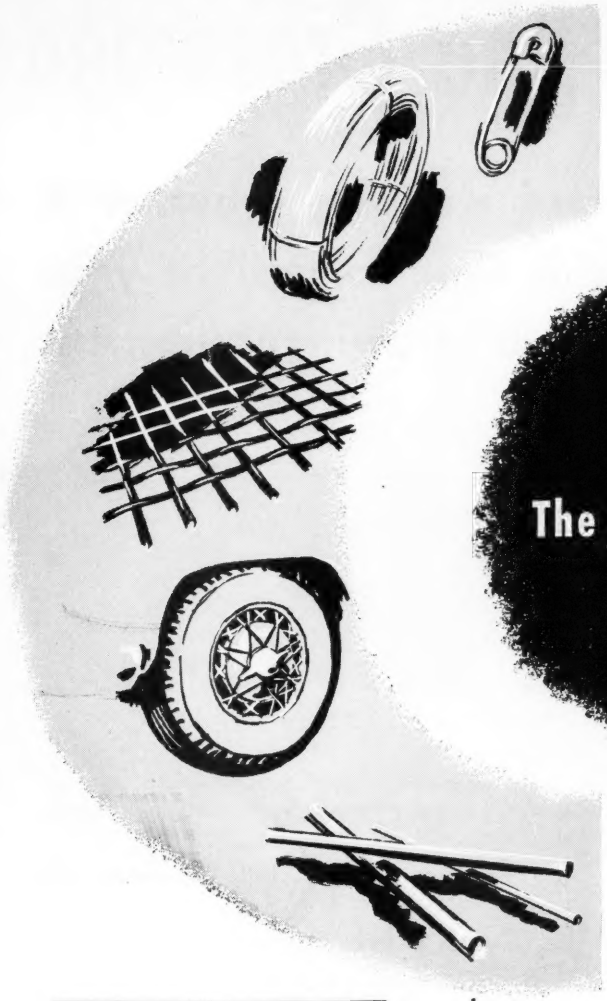
- **TOPS for WIRE PATENTING, too!**
- **IDEAL FOR DESCALING** hot-rolled stainless and alloy steel wire and other shapes employing either the Dupont sodium hydride or the Hooker Electrochemical Virgo bath.

Associate companies: Ajax Electric Furnace Corp. • Ajax Engineering Corp. • Ajax Electrothermic Corp.

AJAX electric SALT BATH furnaces

OVER 4,000 INSTALLATIONS . . . more than all other salt baths combined

AJAX ELECTRIC CO., Inc., 928 Frankford Ave., Philadelphia 23, Pa.



SWIFT'S SOAPS

The efficient lubricant for WIRE DRAWING!

In drawing wire . . . where production and profits depend on speed, a really efficient drawing lubricant is a key operator on your high production team. Actually, the greater your speed of production — the more you depend on the quality, the efficiency of your lubricants.

Swift's soaps are efficient and dependable because Swift's technical laboratories work consistently to maintain high product quality . . . to develop *better* soaps for industry. All of Swift's soaps are produced to meet rigid specifications from the finest raw materials obtainable.

FAST SERVICE

There is a Swift's soap distributor near you . . . 375 of them throughout the U. S. and Canada to provide you with quick delivery and resourceful service. So, next time you need a drawing lubricant, investigate Swift's soaps — see why they are so widely depended upon wherever tough wire drawing jobs call for *real efficiency.*

ONE TRIAL IS BETTER THAN A THOUSAND CLAIMS

IMMEDIATE DELIVERY ON THESE QUALITY SOAPS . . .

- Powdered White Ribbon
- Guaranteed Powder
- Snap Heavy Duty Wire
- Drawing Powder No. 282
- No. 559 Powdered Soap

Call Swift for SOAPS

Another of Swift's Products for Industry

SWIFT & COMPANY
Industrial Soap Department
U. S. Yards, Chicago 9, Illinois

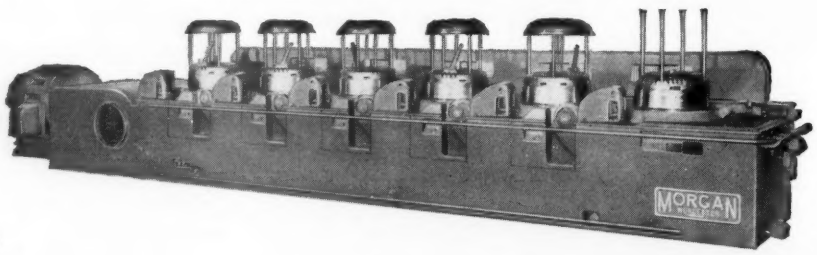
When You're at the Crossroads

. . . of deciding whether it is time to replace your wire drawing equipment —

MORGAN-CONNOR

ask to have a Morgan-Connor engineer study your problem with you. His experience will be valuable in helping you to obtain greater production in the most efficient manner.

Type BW Morgan-Connor Wire Machine



MORGAN CONSTRUCTION CO.
WORCESTER, MASSACHUSETTS

WM-81

WIRE AND WIRE PRODUCTS*

Reg. U. S. Pat. Off.

A monthly publication devoted to the production of Wire, Rod and Strip, Wire and Rod Products and Insulated Wire and Cable.

DRAWING — ROLLING — EXTRUDING — FORMING — FABRICATING

Vol. 29 MARCH, 1954 No. 3

Designated as Official Publication By The Wire Association

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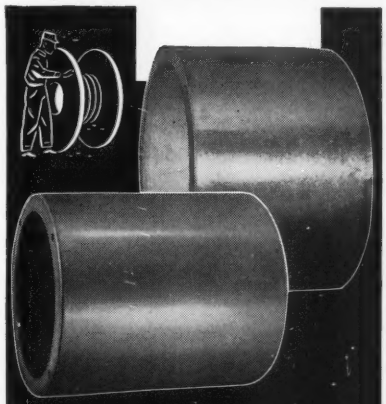
SIMPLE 4 STEP ASSEMBLY
For Wire and Cable Reels



with Republic FLANGED STEEL TRAVERSES

It's as easy as this:

1. Insert bolts through wooden head
2. Lay wooden head flat on floor
3. Place traverse in position
4. Fasten second wooden head in place

● No special tools—no experience necessary. Your reels will last for years—and save money.

Made in sizes up to 56-inch diameter and 48-inch traverse—in plain, painted or hot dip galvanized finish—as light as 18-gauge steel. Width of flange and number of bolt and drain holes furnished to your specifications. Available for prompt delivery. Write for prices.

* * *

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REPUBLIC STEEL

REPUBLIC STEEL CORPORATION
Pressed Steel Division • Niles, Ohio
GENERAL OFFICES • CLEVELAND 1, OHIO
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The pet theory...

of a Bird Cage manufacturer

...he *insists* on "CONTINENTAL WIRE"®

How CONTINENTAL Wire Service Helps Regular Users

- Continental is geared to produce wire made to exacting analyses, tempers, finishes and shapes.
- Continental offers the services of metallurgists and mill technicians to help solve any problems customers may have pertaining to wire fabrication.
- Continental provides a follow-through service, on customers problems that involves real application engineering.
- Continental wire must be right for a particular product application—for it's made right.

• And well he should. Continental's continuing research and testing provides him with wire tailored to fit his product's needs . . . wire of a uniform quality that welds easily, securely and forms under stress without fracturing.

Why not make this insistence on Continental quality and service your pet theory, too? We've valuable case histories and experience gained in more than a half-century of wire making that we can bring to bear on your wire problem. Continental specializes in wire for thousands of applications in practically any size, temper, finish, shape and analysis in low carbon and medium low carbon steels. Let's talk over your wire problems.

Write or phone Continental at Kokomo, Indiana

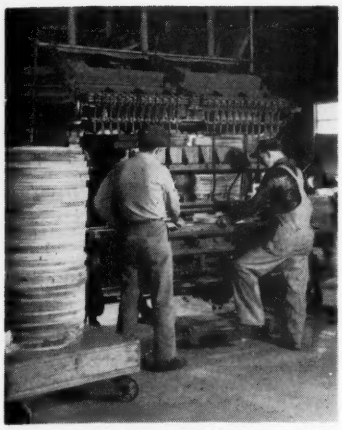
CONTINENTAL STEEL CORPORATION

GENERAL OFFICES • KOKOMO, INDIANA

PRODUCERS OF Manufacturer's Wire in many sizes, shapes tempers and finishes, including Galvanized, KOKOTE, Flame-Sealed, Coppered, Tinned, Annealed, Liquor Finished, Bright, Lead Coated, and special wire. ALSO, Coated and Uncoated Steel Sheets, Nails, Continental Chain Link Fence, and other products.

REELS
for
SHIPPING · HANDLING · PROCESSING

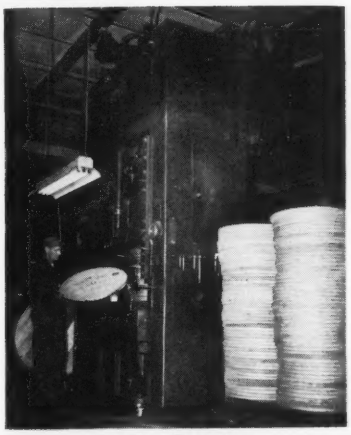
FOR ALL TYPES OF WIRE AND CABLE



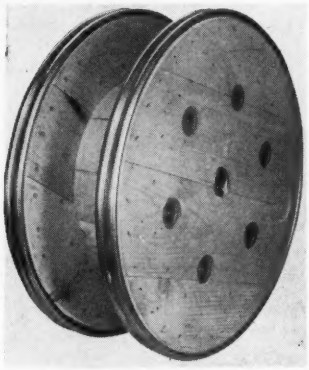
Nailing Operation

NAILED FLANGES—ALL SIZES. Flanges only or assembled as complete reel with stave or steel hub. Produced in our own completely equipped plant.

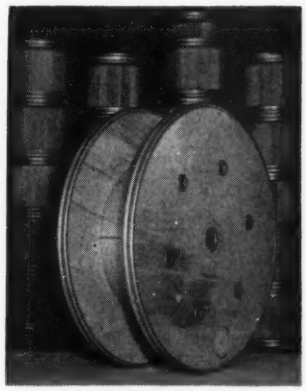
HUBBARD'S DIE FORMED STEEL TIRE. Adds life to reels, eliminates maintenance costs. Applied to nailed, dimension lumber or plywood flanges. Flanges only or assembled with stave, steel or aluminum hubs.



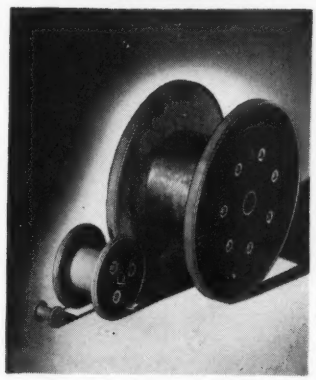
Banding Operation



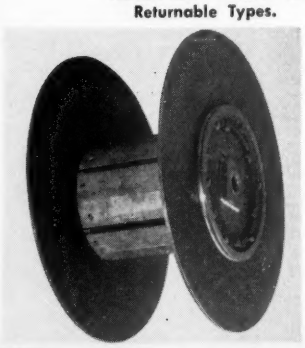
Nailed Reel. Banded for Returnable Types.



Dimension Lumber for Returnable Reels.

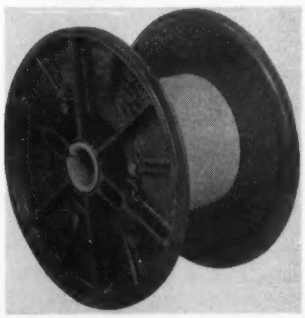


Plywood—Process and Returnable Shipping Reels.



Left: Special Reels Made to Your Designs

The HUBBARD line includes all types of spools and reels required for any shipping, shop or processing need.



Right: Light Alloy Cast Reels for Process & Shipping

HUBBARD SPOOL COMPANY

GARRETT • INDIANA

Telephone: 840

"THE BIGGEST NAME IN SPOOLS AND REELS"

HERBORN

MECHANICAL SCALE REMOVING EQUIPMENT — MODEL MEA

OUTSTANDING ADVANTAGES:

- No pickling process or acid treatment involved.
- Considerable cost-saving by combined de-scaling and drawing operation.
- Elimination of wire transports.

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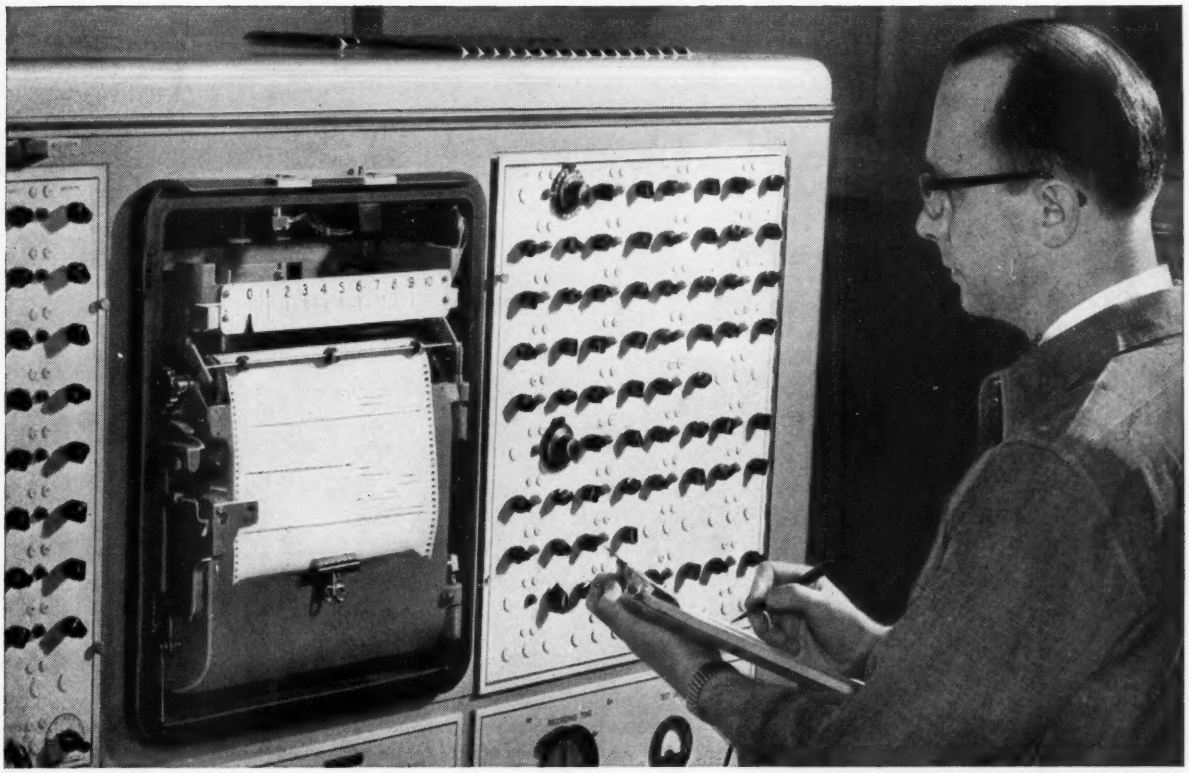
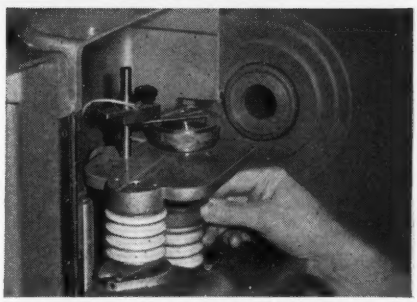
SURE, we're sure
you're getting the right copper alloy!



CHASE metallurgists use fantastically accurate instruments to check the brass shipped to you in wire, rod, sheet or tube.

The Quantometer, for instance, tests a brass sample for 18 elements in 1½ minutes.

An Electron Microscope, Spectroscope, and an X-ray Diffraction Unit are also part of Chase laboratory equipment so that we can be absolutely certain that the Chase brass you buy has exactly the right composition, grain structure, temper, dimensions and other physical characteristics your product requires.



Here a brass sample is being inserted into the arc-spark stand of the Quantometer for analysis. In a matter of only 1½ minutes, sample will be completely analyzed.

Chase® BRASS & COPPER

WATERBURY 20, CONNECTICUT • SUBSIDIARY OF KENNECOTT COPPER CORPORATION

The Nation's Headquarters for Brass & Copper

Albany†	Cleveland	Kansas City, Mo.	New York	San Francisco
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Boston	Detroit	Minneapolis	Providence	
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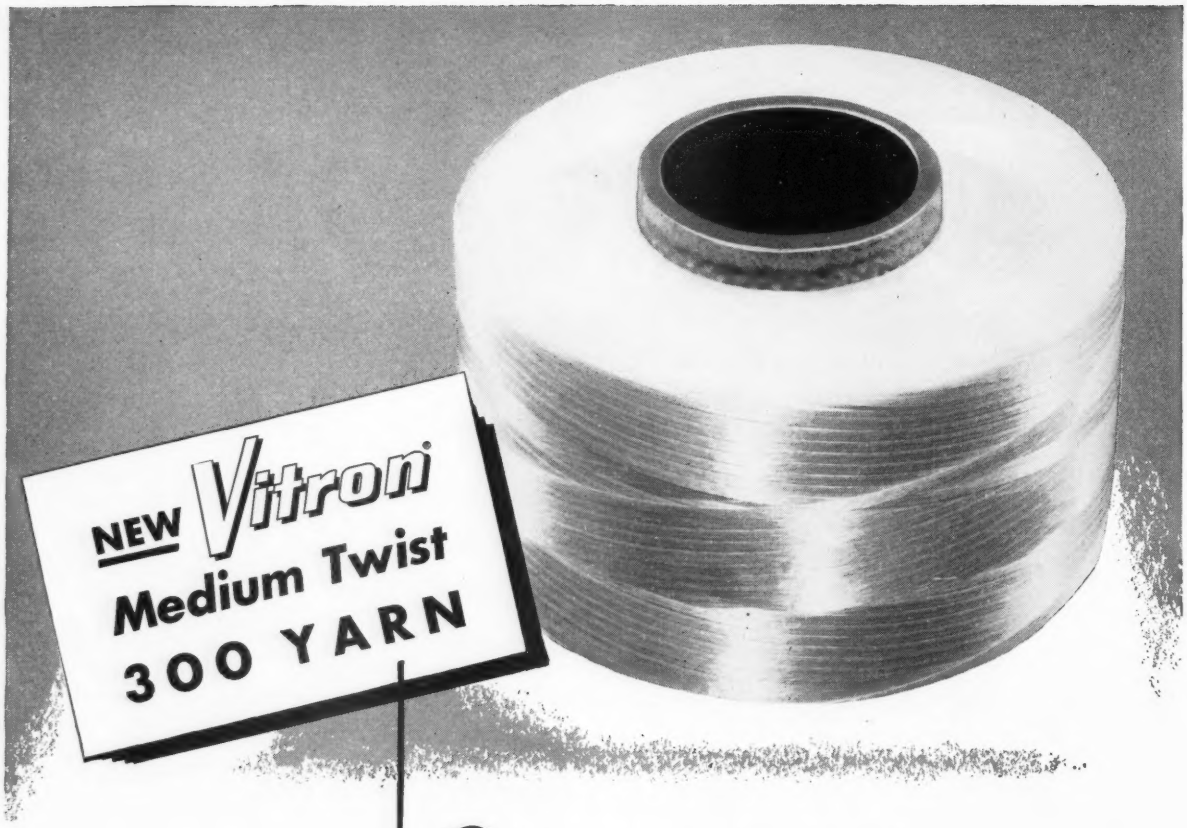
Cincinnati	Indianapolis	New Orleans	St. Louis	office only)



OFFERS 3 IMPORTANT ADVANTAGES

Also a New 150 Yarn

This new 150 yarn with 300 filaments gives you a very smooth wire, with minimum fuzzing, thus reducing scrap. The finer, more flexible filaments make a yarn which is more abrasion resistant, which bends readily without breaking.

1 Control of spread and build

New medium twist permits more flexibility and better control of spread and build.

2 Inventory reduction

Each of these medium twist packages will do a wide variety of jobs and thus cut yarn inventory as much as one third.

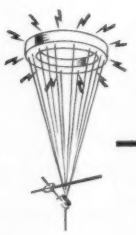
3 Smooth, uniform wire—minimum fuzzing

Tests show that this medium twist yarn reduces fuzzing to a minimum, resulting in a smooth finish.

THE SECRET IS UNIFORMITY

The advantages offered by this new medium twist 300 yarn are directly attributable to uniformity: uniformity of the yarn itself, and uniformity both in size and quality of the package. And for that the credit must go to the Electronic-Extrusion process, which produces glass filaments of consistently uniform diameter. *No other maker of glass fibers uses this process.*

For information and samples, write to Glass Fibers Inc., 1810 Madison Avenue, Toledo 2, Ohio.



GLASS FIBERS *INC.*

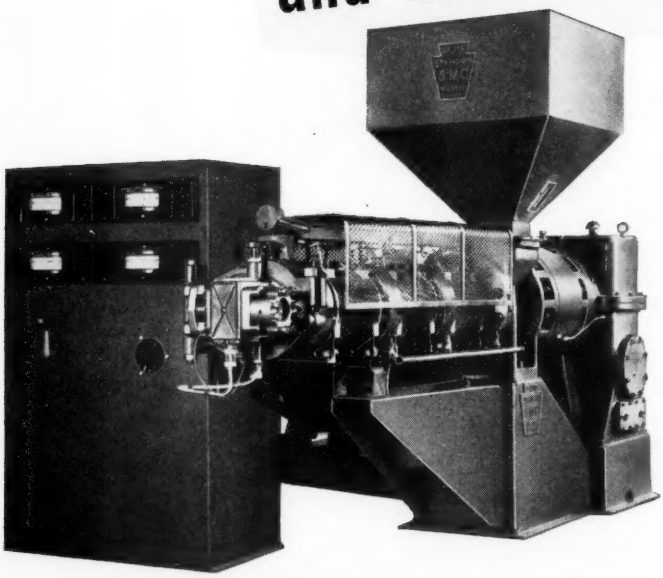
Makers of glass fibers by the ELECTRONIC-EXTRUSION process ... developed, patented and used exclusively by Glass Fibers Inc.

VITRON Yarns • Rovings • Micro-Fibers • **DURAMAT** Vapor Barriers **BLUE FLAG** Pipe Wrap • **MICROLITE** Thermal and Acoustical Insulation • **VIBRAGLASS** Mounting and Packaging Materials **COUSTIC-AIRE** and **THERMO-JET** Aircraft Insulations

In Extrusion Equipment

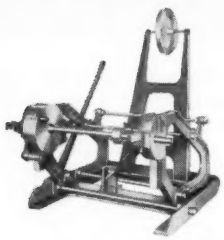
DAVIS-STANDARD and HIGH STANDARD

Go Together



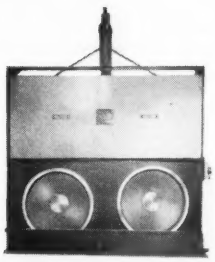
High production standards—in operating efficiency and product superiority are the assured result with Davis-Standard extruding machines. Not only does Standard Machinery give you exclusive features★ found in no other extruders, but it follows through with the necessary auxiliary equipment for complete production satisfaction.

If your standards are high you'll appreciate the performance of Davis-Standards: equipment that does the job *perfectly* and *completely*.



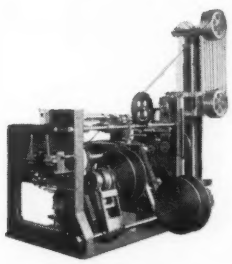
PAY-OFF

Equipped to take reels up to 36" in diameter. Cam-and-lever lift from floor. Mechanism is automatically self-braking, with brake activated by any slackening of wire speed. Rugged construction.



DAVIS-STANDARD CAPSTAN

Drag and pulling type. Supplied for almost all wire plant needs. Aluminum or cast iron drums, grooved or flat, in any radius desired. Gear reducers standard, four-speed transmission optional.



NEW-TYPE TAKE-UP

Great new efficiency. Quiet, vibrationless. No gears or clutches. Operates positively at high speeds. Reel drive by multiple V-belts. Automatic brake. Totally new traverse mechanism. Speed range choice for constant tension control. Built in two sizes: for reels 12" to 24" and 24" to 36".

★ Davis-Standard "Stream-Flo" head assures continuous production at a high rate.

★ Davis-Standard "Therma-Fin" heating jacket (patent pending) permits a broad range of controlled temperatures to be obtained.

DAVIS-STANDARD SALES CORPORATION

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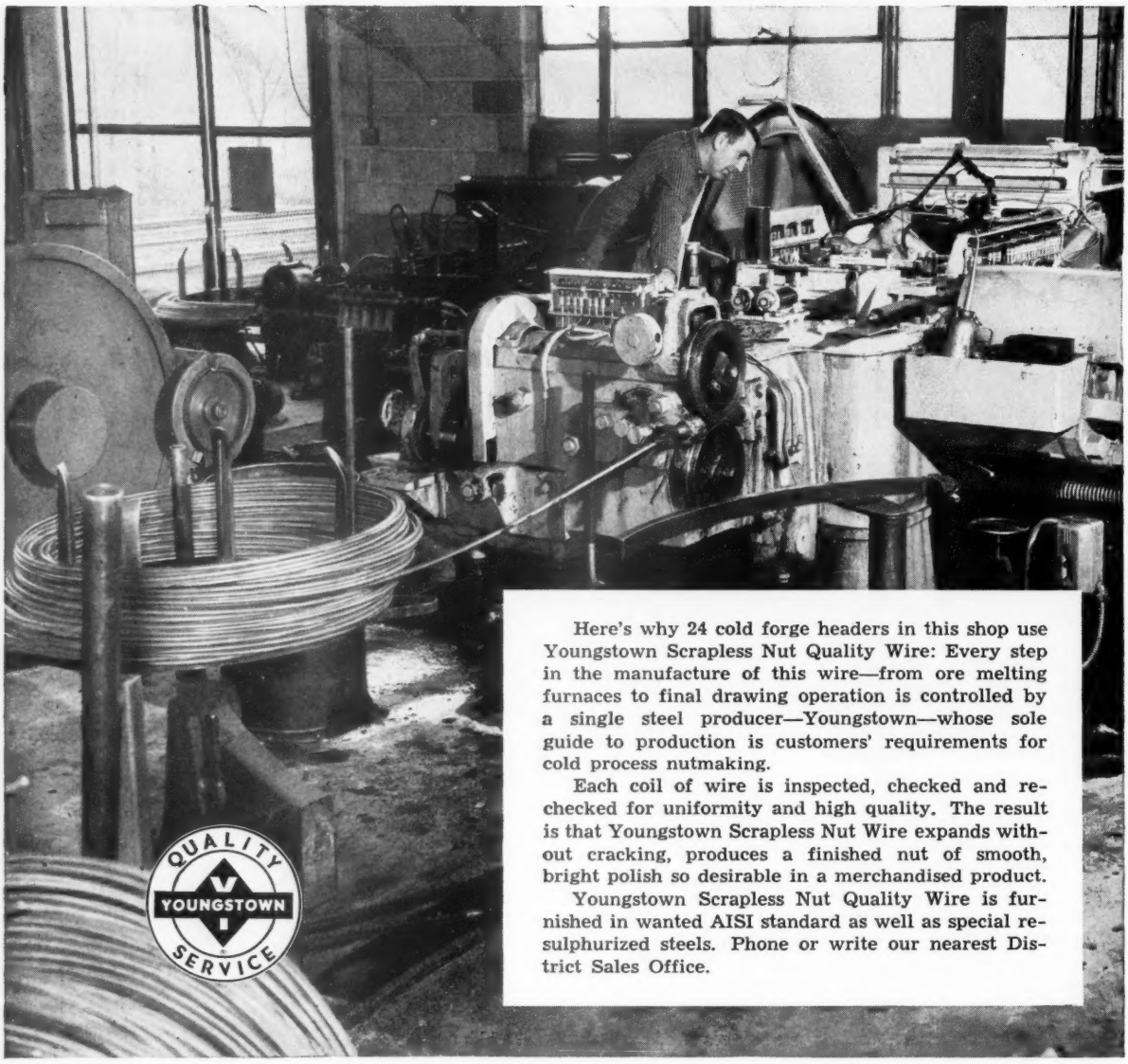
THE STANDARD MACHINERY COMPANY

EXTRUDING MACHINES AND MOLDING PRESSES

World's Largest Manufacturers of Custom-Built Extruding Machines

NUTS DON'T CRACK WHEN FORGED FROM YOUNGSTOWN SCRAPLESS NUT WIRE



Here's why 24 cold forge headers in this shop use Youngstown Scrapless Nut Quality Wire: Every step in the manufacture of this wire—from ore melting furnaces to final drawing operation is controlled by a single steel producer—Youngstown—whose sole guide to production is customers' requirements for cold process nutmaking.

Each coil of wire is inspected, checked and rechecked for uniformity and high quality. The result is that Youngstown Scrapless Nut Wire expands without cracking, produces a finished nut of smooth, bright polish so desirable in a merchandised product.

Youngstown Scrapless Nut Quality Wire is furnished in wanted AISI standard as well as special resulphurized steels. Phone or write our nearest District Sales Office.

Youngstown SCRAPLESS NUT QUALITY WIRE

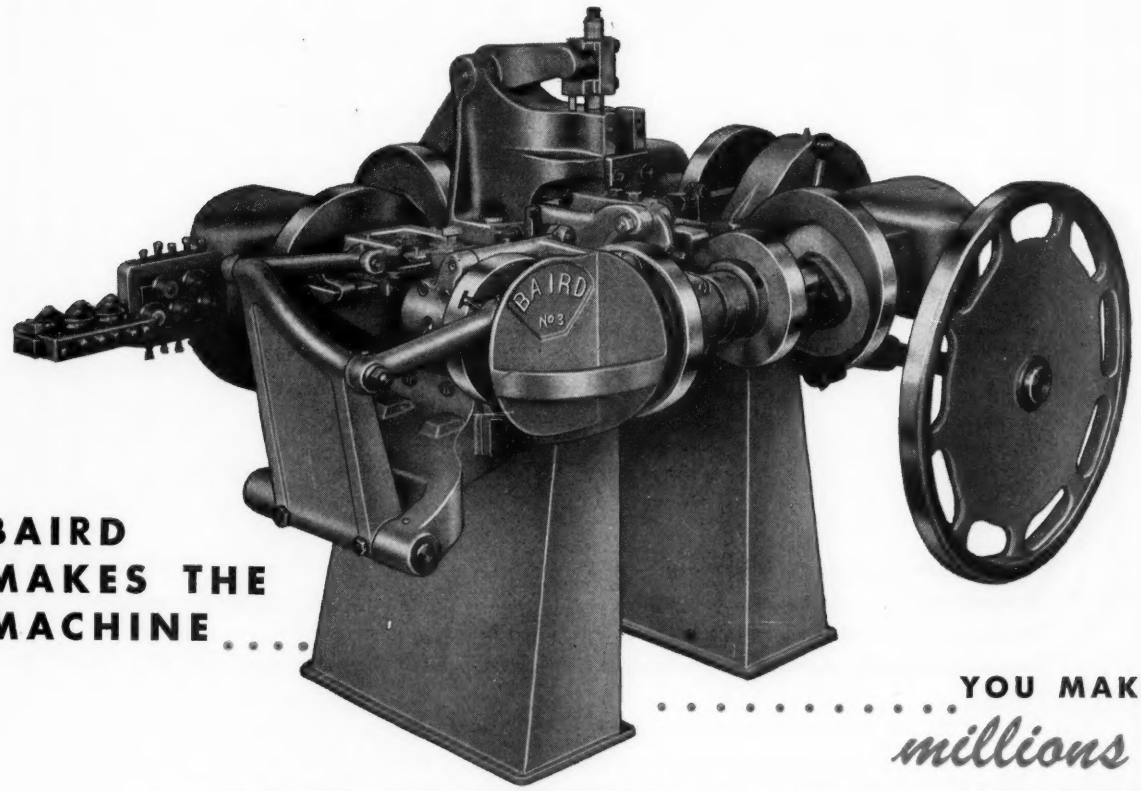
THE YOUNGSTOWN SHEET AND TUBE COMPANY *Manufacturers of Carbon, Alloy and Yoloy Steel*

General Offices: Youngstown, Ohio - Export Office: 500 Fifth Avenue, New York 36, N. Y.

PIPE AND TUBULAR PRODUCTS - CONDUIT - BARS - RODS - COLD FINISHED CARBON AND ALLOY BARS - SHEETS - PLATES - WIRE - ELECTROLYTIC TIN PLATE - COKE TIN PLATE - RAILROAD TRACK SPIKES

ASK **BAIRD** ABOUT IT!

HIGH PRODUCTION TOOLING



BAIRD MAKES THE MACHINE . . . . . YOU MAKE *millions*

. . . OF ACCURATELY FORMED WIRE AND RIBBON METAL PARTS

The Baird automatic Four-Slide Machine produces an extremely wide variety of articles made of any commercial wire . . . round, half-round, square, or flat . . . at highest speeds. It takes coiled wire from a reel, straightens, feeds, and cuts off the required length . . . then forms and ejects the part produced. Eight sizes handle shorter wire lengths; three sizes take longer lengths to 32½".

By means of special attachments, the versatility of the machine is further extended to include the making of round wire and ribbon metal rings, secondary cut-offs, lettering, and other operations.

The detailed and complete story, with specifications, is told in our new Four-Slide Bulletin. If you require hundreds of thousands or millions of wire units to ½" dia., or flat ribbon metal products to 1½" wide . . . this is your profit-making machine. Send for bulletin.

3BA53

the **BAIRD MACHINE COMPANY**
STRATFORD • CONNECTICUT

AUTOMATIC MACHINE TOOLS • AUTOMATIC WIRE & RIBBON METAL FORMING MACHINES • AUTOMATIC PRESSES • TUMBLING BARRELS

IF you learned of a new drawing compound that costs no more than conventional compounds, lasts twice as long, and makes your dies last longer, too...

YOU'D TRY IT, WOULDN'T YOU?

That's exactly what we claim for Nopco DURPON® Drawing Compounds for wet drawing non-ferrous metals. If our claim is accurate—and it is—you can surely take an important bite out of your costs. Why not write or wire today for a 5-gallon testing sample and make us prove Durpon's economy?

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CHEMICAL COMPANY
Harrison, New Jersey
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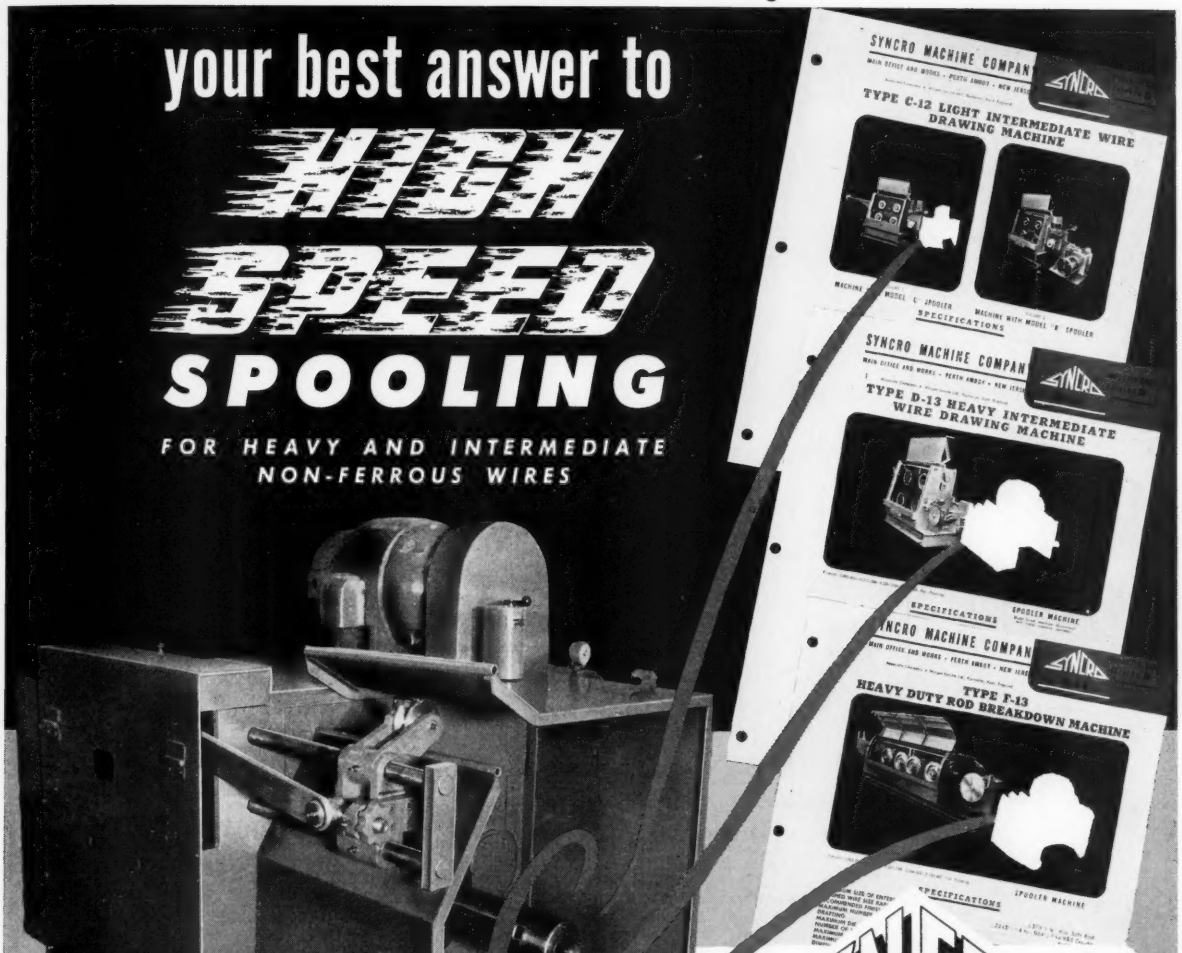
"Stay Stable Longer"
DURPON
for intermediate wire
DURPON L
for rods, tubes, heavy wire
DURPON FW
for fine wire

your best answer to

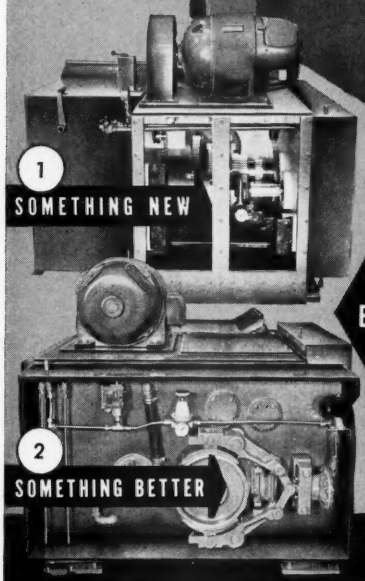
HIGH SPEED SPOOLING

FOR HEAVY AND INTERMEDIATE NON-FERROUS WIRES



SYNCRO

. . . with their policy of "SOMETHING NEW—SOMETHING BETTER" have developed, and proven under actual working conditions, a spooler to enable higher speeds not previously possible. Spooling is the heart of your wire drawing operations. To fulfill the need for faster spooling, to cope with faster drawing, SYNCRO now offers this unit for profitable replacement of existing spooling devices, or for new installations,—SYNCRO or otherwise. Inquiries are welcome.



1 SOMETHING NEW

2 SOMETHING BETTER

1 TUMBLER GEARS ALLOW SIX FAST SPEED CHANGES

EXCLUSIVE with SYNCRO

2 IMPROVED PNEUMATIC BRAKING SYSTEM — QUICK-ACTING • POSITIVE • LONG-WEARING

Machinery for the Wire Industry

WIRE DRAWING MACHINES • STRANDERS • DIE STRINGERS
PAYOFFS • CABLERS • CONTINUOUS ELECTRIC ANNEALERS
CAPSTANS • WIRE INSULATORS • HEAVY DUTY TAKE-UPS
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Steelskin

Manufacturers of

POWDERS, COMPOUNDS GREASES & COATINGS

for

WET & DRY DRAWING

of

WIRE, TUBING BARS & SHEETS

NON-FERROUS FERROUS

STEELSKIN CXH
Wire-Drawing Powder

More wire is drawn through **STEELSKIN CXH** than any other lubricant.

STEELSKIN CXH is a compounded metallic-stearate-type soap powder used for drawing both high and low-carbon steel wire, as well as many non-ferrous metals. It is being used successfully with all types of coating.

Wire for springs, rope, nails, tire bead, screen cloth, poultry netting, galvanizing and many other applications is drawn through **STEELSKIN CXH.**

And REMEMBER . . . as a STEELSKIN customer, you are entitled to STEELSKIN "on-the-job" service. This service is backed by over 40 years' experience in the field of wire-drawing lubrication.

R. H. MILLER
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Please send more information on
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We draw: ☐ Steel ☐ Dry ☐ Sizes .....
☐ Copper ☐ Wet .....
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First in
LUBRICATION!
First in
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Since 1909

INDEX 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15
CORROSION RESISTANCE
RESISTANCE TO SCALING
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HERE'S THE ANSWER TO FAST ACCURATE SELECTION OF STAINLESS STEELS
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REZISTAL® STAINLESS STEEL SELECTOR
FOR MAKING THE MOST OF STAINLESS STEEL
NOMINAL COMPOSITION

The answer to most of your questions about stainless steels are right at your finger tips, when you use Crucible's unique new Stainless Steel Selector.

Want to know the machinability characteristics of a stainless grade? Resistance to corrosion or scaling? Physical or mechanical properties? You can get the answers to these and other questions simply by setting the arrow on the Selector slide at the proper window. It's just as quick and easy as that.

And almost as fast as you get the answer, you can get the steel you need. For many of the REZISTAL stainless steels shown on the Selector are carried in stock in Crucible warehouses conveniently located throughout the country.

To get your free copy just fill in and mail the coupon. Better do it now.

HOW THE SELECTOR WORKS:

Start with the problem. For example, resistance to corrosion in contact with copper sulfate. Just set the slide at the proper index number shown on the Selector (in this case on the back), and you have the answer in a second – grades 302 and 316 are fully resistant to this form of attack.

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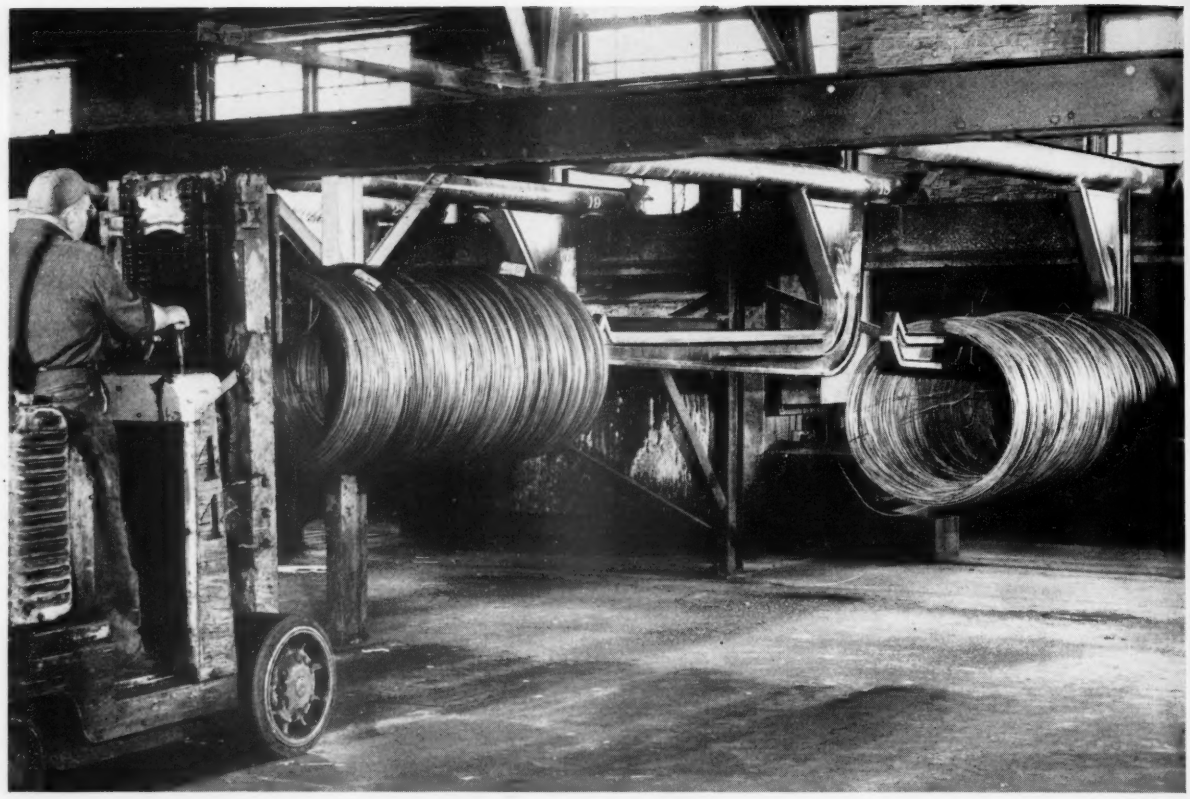
CRUCIBLE first name in special purpose steels

54 years of Fine steelmaking **STAINLESS STEELS**

CRUCIBLE STEEL COMPANY OF AMERICA, GENERAL SALES OFFICES, OLIVER BUILDING, PITTSBURGH, PA.

REX HIGH SPEED • TOOL • REZISTAL STAINLESS • MAX-EL • ALLOY • SPECIAL PURPOSE STEELS



WELDCO Fabricated Hooks For Longer Service

Greater Strength—and Extra Protection at the "Acid Line"

IN plants and wire mills all over the country, WELDCO Fabricated Pickling Hooks are replacing heavy, old-style hooks. For plant managers and engineers are discovering that WELDCO Fabricated Hooks are stronger, lighter in weight, easier to handle, more corrosion-resistant, and carry heavier loads . . . easily and safely. And here's another important reason: Because of their superior design, WELDCO Monel or Stainless Steel Hairpin Hooks give extra protection at the "acid line," where ordinary hooks usually fail. This feature alone will add many extra years of service life!

For all your pickling and liming equipment, rely on WELDCO's ingenuity and years of fabricating experience. Whether you need conventional lightweight pickling hooks or special adaptations, WELDCO engineers design and build to meet your exact specifications. For complete pickling information, and a free copy of the WELDCO catalog, get in touch with us today.

WELDCO

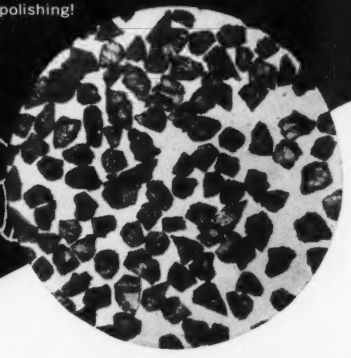
THE YOUNGSTOWN WELDING & ENGINEERING CO.

3721 OAKWOOD AVE. . . YOUNGSTOWN, OHIO

ELGIN

gives you a close look at finishing economy

Microscopic view of Elgin Diamond. Note the uniform size of all the particles . . . the key to faster, finer, money-saving polishing!



HERE IS WHY PRECISION GRADED ELGIN DIAMOND CUTS COSTS!

In lapping and polishing, uniformity of diamond particles is the reason why Elgin Diamond cuts costs . . . offers highest finishing economy. From pure virgin diamond to final product, through crushing, grading and compounding, every step of production is controlled in Elgin's laboratories. The finest grades are precisely separated by Elgin's exacting "layers of water" process. In each grade, diamond particles are of uniform size—none are oversize so they scratch. Instead, you get a finer, faster, lower cost finish . . . every time! So place your confidence in Elgin Diamond . . . write for specific application data today!

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ABRASIVES DIVISION
Dept. G

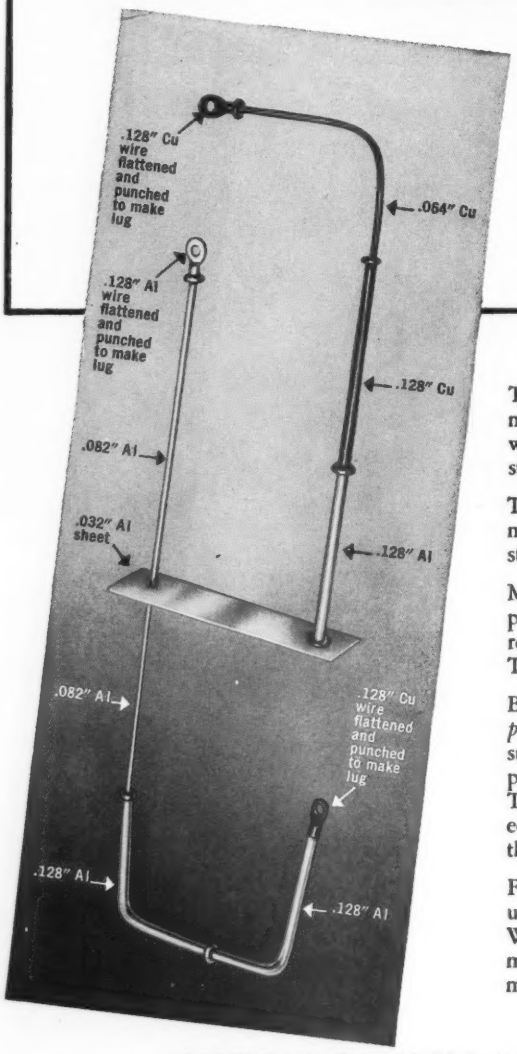
ELGIN NATIONAL WATCH COMPANY

ELGIN, ILLINOIS

GET PERFECT WELDS

without heat, electricity or chemicals

in just seconds!


.128" Cu wire flattened and punched to make lug
.064" Cu
.128" Al wire flattened and punched to make lug
.128" Cu
.082" Al
.032" Al sheet
.128" Al
.082" Al
.128" Cu wire flattened and punched to make lug
.128" Al
.128" Al

This new and perfected process buttwelds through pressure *alone*—the metal is pressed together between specially designed dies. UTICA Koldwelding is so easy and foolproof that even unskilled workers of average strength can make perfect welds in just seconds.

They're real *welds*, too—not just bonds! Actual inter-molecular flow of metal occurs. Tests show Koldwelds have 95% to over 100% the tensile strength of the parent wire.

More than that, the inter-molecular connection results in an electrically perfect splice. No flux, second metal or alloy is present at weld. Electrical resistance will not change because of oxide films, corrosion, moisture, etc. There is no change in wire diameter—and flash is easy to remove.

Buttwelding is done with a hand tool 14" long, *weighing only five pounds!* Each UTICA KOLDWELDING tool is supplied with lightweight carrying case and precision dies to fit the user's specific needs. This UTICA tool with its dies is the total equipment needed for Koldwelding out in the field or in the production line!

For further information, please write telling us as much as possible about your application. We should know the sizes and grades of metals to be welded and other pertinent information.

WELDS UNLIKE METALS!

Many difficult wire welding jobs can be accomplished easily with UTICA Koldwelding equipment. The process buttwelds various *non-ferrous* metals such as aluminum, hard and soft electrical copper, platinum, silver and other metals—welding the same or unlike metals together . . . such as aluminum to copper, etc. Also easily welds different gauges of wire together. Flash is easily removed with fingers or small pliers. Wire may be drawn after Koldwelding and tests show it will part at some point remote from the Koldweld. Typical wire mill tests have drawn Koldwelded .164 aluminum wire down to .019 at high speed—with fifteen Koldwelds in a 25-foot length. There were no breaks, no identification of Koldwelded joints after drawing.

Made by UTICA*—producers of 86 types of pliers, most in several sizes . . . and other fine forged tools.*

UTICA KOLDWELD

U TI CA ®

DROP FORGE & TOOL CORP., Utica 4, N. Y.

"UTICA", when applying to tools made by Utica Drop Forge & Tool Corp. is a Trade Mark Reg. U. S. Pat. Off.

USE
"America's Finest Wire Drawing Lubricants"

MAY WE HELP YOU?

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CHICAGO 44, ILLINOIS
Telephone: MAnsfield 6-9324-5-6

FOR BONDING STRANDED WIRE and LOCALIZED ANNEALING of SPRING WIRE

Lepel

LOW COST—PORTABLE HIGH FREQUENCY *Induction* HEATING UNIT

This newly developed tube operated high frequency generator is ideal for bonding together the ends of the individual strands of multi-strand wire and cable, thus eliminating the necessity of tin-dipping the ends of the wire after cutting and stripping.

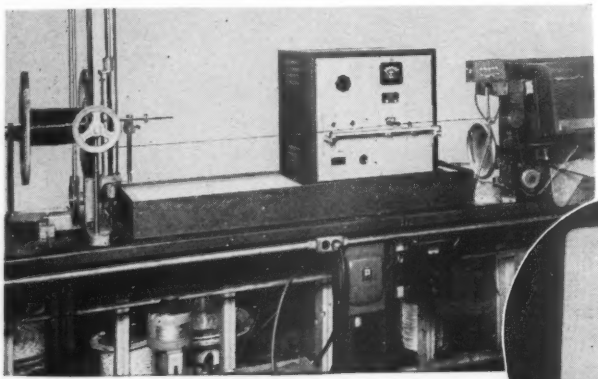
This highly versatile unit can be used in conjunction with an automatic wire cutting and stripping machine. When used in this manner, the wire is fed continuously through the load coil of the generator and the heating cycle is synchronized with the stroke of the wire cutter. The wire is heated and bonded at successive points where the subsequent cutting and stripping operations occur. The same set-up may be used for localized annealing of spring wire except for the use of a spring winding machine instead of the wire cutter and stripper.

The Lepel Model T-1-W is also ideally suited for heat treating thin parts such as surgical needles and dental burrs, and joining various types of wire products.

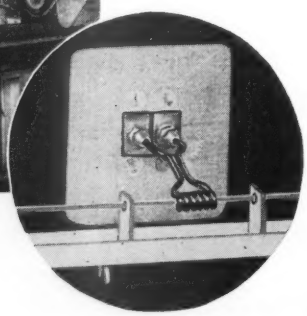
MODEL T-1-W

$885.

F. O. B. FACTORY



Set-up for automatic bonding, stripping and cutting in the wire department of the Federal Telephone and Radio Corp.



Enlarged view of the coil arrangement with the insulated wire passing continuouly through the heating coil.

SPECIFICATIONS AND FEATURES

The power input is 1.6 KVA at 115 volts, 60 (or 50) cycles, single phase.
A stepless Thyratron Control is incorporated to adjust output power for heating various thicknesses of wire and other parts.
The water consumption is negligible, requiring but a fraction of a gallon per minute. Ordinary tap water pressure is sufficient.
As a precautionary measure, a magnetic trip circuit breaker protects the generator from overloading.
This unit can be operated by a footswitch or with an automatic timer.
Dimensions: 21" wide, 18" high, 15" deep. Weight: 150 pounds.

All Lepel equipment is certified to comply with the requirements of the Federal Communications Commission.

LEPEL HIGH FREQUENCY LABORATORIES, INC.
55th STREET and 37th AVENUE, WOODSIDE 77, NEW YORK CITY, N. Y.

WIRE and WIRE PRODUCTS

reaches many prospects

YOUR SALESMEN DON'T KNOW!

No matter how big you are, the odds are you don't know all your actual prospective customers.

If your company is small, it is even more important to be "calling" on your prospects and customers regularly through advertising.

Your advertising in Wire and Wire Products will be seen by many people in the plants you wish to "sell" whom your salesmen never would see, yet who specify, actually buy or who influence decisions on products to be purchased. Your advertising is bound to be of immeasurable value to you, too, in paving the way for a good reception for your salesmen when they do call. And the field's buying power is tremendous!

WIRE AND WIRE PRODUCTS circulation, is all paid. We have no agents, offer no premiums or make special inducements to get circulation, except the value of the editorial contents in itself—yet our renewals have averaged 97% or better for many years. That's why it is a good and forceful advertising medium for all concerns who have products to sell to the wire industry.

● GET YOUR SHARE OF THE BUSINESS . . .

● ADVERTISE IN WIRE AND WIRE PRODUCTS . . .

● SEND FOR ADVERTISING RATES TODAY . . .

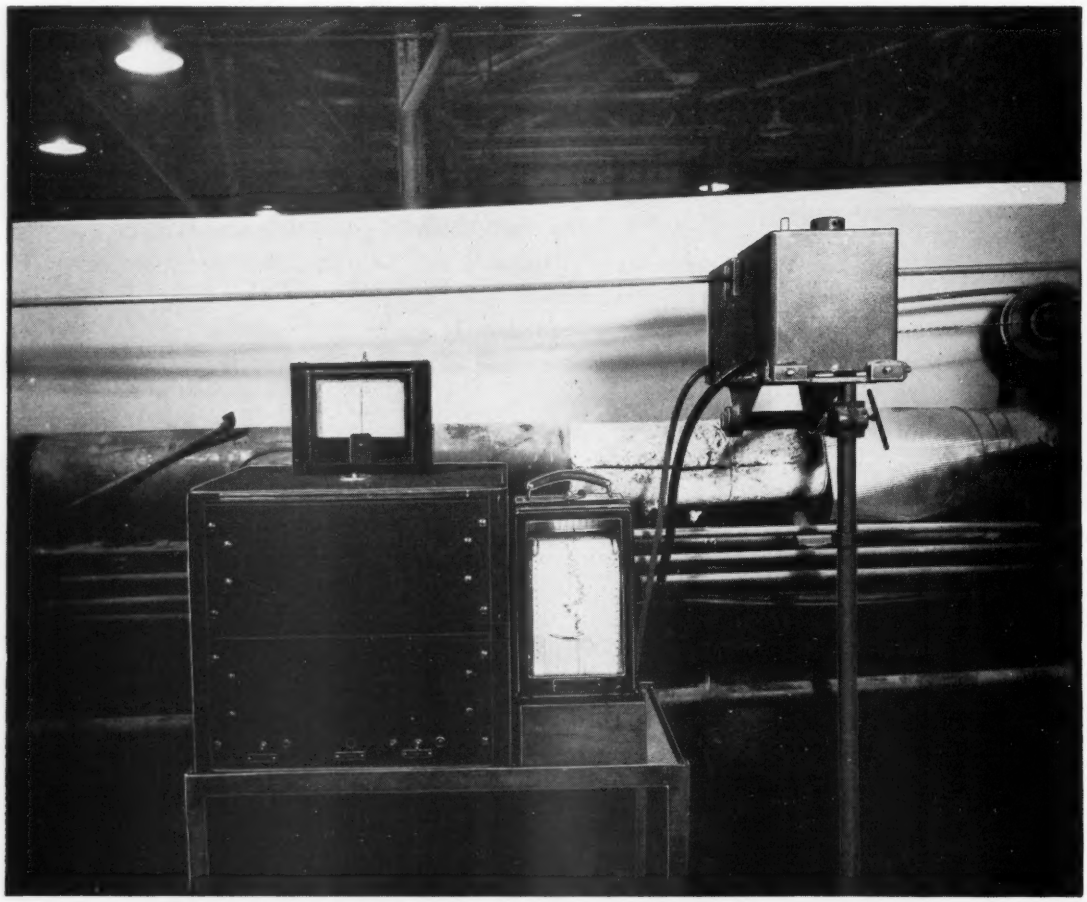
WIRE AND WIRE PRODUCTS

453 MAIN STREET **STAMFORD, CONN.**

Scrap Reduction
Equipment Efficiency
Reduced Costs
Controlled Quality

IN PROCESS DIAMETER CONTROL
DRIFT-FREE
NON-CONTACT

SERC "DIAMACONTROL"



INSTALLATION IN A WELL-KNOWN PLANT

Write for further information
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Our Foreign Representative:
ANDREW S. SZUCS, INC.
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your

SPECIFICATIONS

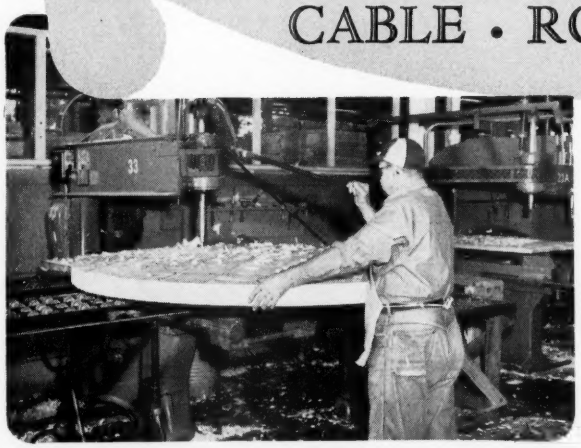
are our

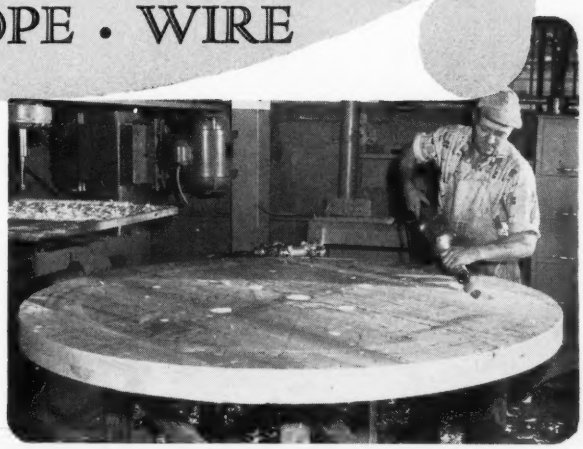
BLUEPRINTS for...

Quality WOOD REELS

for

CABLE • ROPE • WIRE





EVERY type of WOOD REEL, Returnable or Non-returnable, for the WIRE INDUSTRY . . . from 10" to 10' in Diameter.

STRAIGHT-LINE production methods and extensive facilities produce precision-made REELS of highest Quality at prices that make it good business to buy from BRIDGE.

A completely MODERN plant, with the very BEST and FASTEST equipment, much of it specially designed for us, assures you of rapid SERVICE and TOP QUALITY REELS.

HIGH SPEED

SHIPPING SERVICE in our . . . OWN TRUCKS

within a radius of 200 miles from the plant. Fast freight will bring you Bridge reels in 5 days or less east of the Mississippi.

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MANUFACTURING COMPANY

HAZARDVILLE, CONNECTICUT

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Thompsonville, Connecticut

Riverview 9-8308

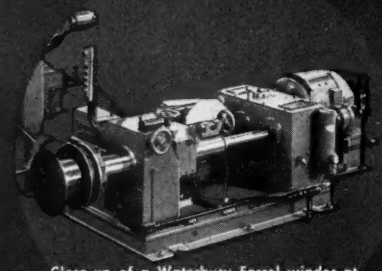
"REAL GOOD . . .

Let us quote on your reel needs. Send your specifications. Better yet, visit our plant and see how and why our reels are made so well at so low a cost.

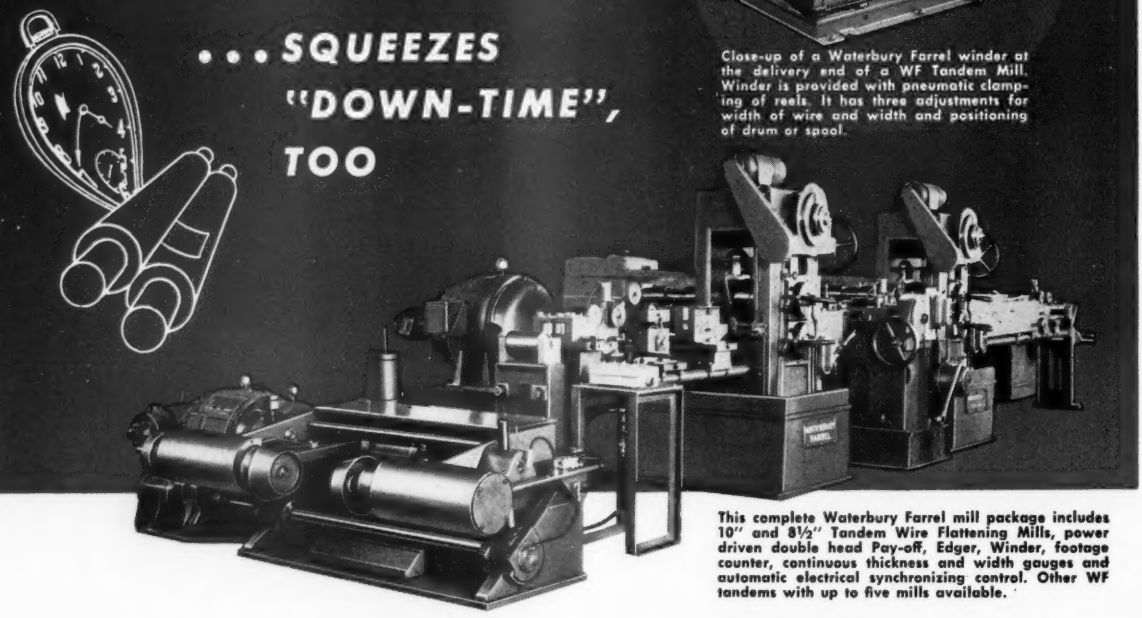
WOOD REELS"

THIS WF WIRE FLATTENING TEAM

. . . SQUEEZES "DOWN-TIME", TOO



Close-up of a Waterbury Farrel winder at the delivery end of a WF Tandem Mill. Winder is provided with pneumatic clamping of reels. It has three adjustments for width of wire and width and positioning of drum or spool.



This complete Waterbury Farrel mill package includes 10" and 8½" Tandem Wire Flattening Mills, power driven double head Pay-off, Edger, Winder, footage counter, continuous thickness and width gauges and automatic electrical synchronizing control. Other WF tandems with up to five mills available.

Modern Waterbury Farrel Mill Design Insures High Production Plus Precision . . . Minimizes "Down-Time"

Here are some reasons why Waterbury Farrel Wire Flattening equipment can give you *more continuous,* high speed, precision production.

- Loading payoff and motor driven screwdowns for mills and edgers facilitate threading of wire with minimum effort and time.
- To protect precision operation, soluble oil is circulated internally and externally on the rolls and into coolant enclosures where wire is submerged. A refrigeration system maintains the coolant oil temperature at approximately 70° while a flotation unit keeps it clean and fresh. In addition, high speed mills also have a self-contained, automatically-filtered circulating mineral oil lubrication system for roll necks and drives.
- Transparent lucite covers at vital lubrication points such as gear cases and universal joints make it easy to check lubrication at a glance.
- Anti-friction bearings are used for all rotating members including the winder shaft. High precision anti-friction bearings are used on roll necks and edger arbors. This, combined with precision fitting of component parts enables WF mills to maintain tolerances well inside commercial allowance.
- Tungsten carbide ring rolls permit rolling the toughest alloys and increase roll life.
- Electric control keeps wire tension constant. Dancer rolls are used for fine wire.

Waterbury Farrel designs and builds a wide range of wire flattening mill equipment to suit specific requirements. Various sizes and combinations of single and multiple mill stands with auxiliary equipment are available for flattening ferrous and non-ferrous wire from the smallest diameters to 1" diameter and more. Speeds range up to and above 2500 FPM.

Write for further information.

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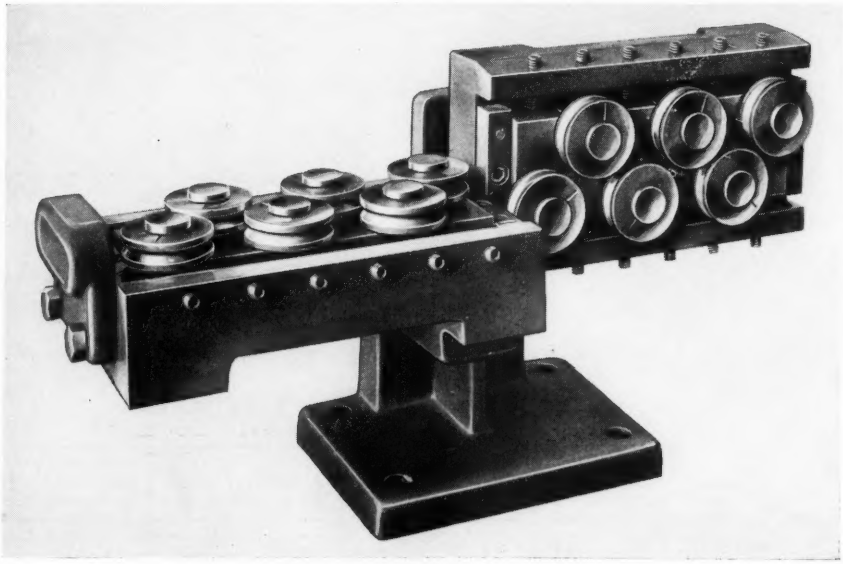
WF-9

SHUSTER

ROLL TYPE WIRE STRAIGHTENER

Twelve Roll Central Foot



Shuster Roll Type Wire Straighteners are generally used in connection with automatic wire forming machines, headers, power presses and similar equipment. As the wire is drawn through, the straightener removes the natural curve of the coil, neutralizing any tendency to kink, snarl or twist. The wire enters the dies of the forming machines straight—ready for fast production runs.

There is no feeding attachment and the wire must be pulled through manually or mechanically. Rolls are grooved for straightening round wire and square stock. Machines are equipped with **needle bearings.**

This type is made in six sizes to accept wire from .045 to 9/16" diameter. For Flat Stock send dimensions.

We shall be pleased to furnish any further information you may wish.

NOW AVAILABLE FROM STOCK

MODEL	WIRE DIAMETERS	PRICE
ROL1	.045 to 3/32"	$154.00
ROL2	3/32" to 5/32"	176.00
ROL3	5/32" to 7/32"	207.00
ROL4	7/32" to 5/16"	248.00
ROL5	1/4" to 3/8"	495.00
ROL6	3/8" to 9/16"*	779.00

*Normal capacity ⅜" to ½", 9/16" grooving on request

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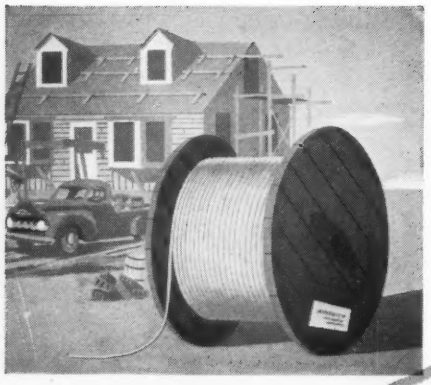
Electrical wire and cable coatings

Call for CELLUFLEX* 179C



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- **RAPID FUSION**

DESCRIPTIVE DATA

CELANESE* PLASTICIZER	GRADE	APPEARANCE	COLOR APHA Max.	SPECIFIC GRAVITY @ 20/20°C.	ACIDITY	ESTER VALUE % Min.	PERMANGANATE TIME, Min. (in Minutes)	REFRACTIVE INDEX $@ n \frac{25°C.}{D}$
LINDOL* tricresyl phosphate coal tar base	Technical	Clear transparent liquid	75	1.165 ± .005	0.01 (3)	99	30	1.553
CELLUFLEX* DBP dibutyl phthalate	Technical	Clear transparent liquid	50	1.045 ± .001	0.01 (2)	98	—	1.490
CELLUFLEX* 179C tricresyl phosphate petroleum base	Technical	Clear transparent liquid	150	1.165 ± .005	0.01 (3)	99	30	1.553
CELLUFLEX* TPP triphenyl phosphate	Technical	White flakes	20 (4)	1.202 ± .005 (1)	0.003 (3)	99	30	1.550 (1)
CELLUFLEX* 112 a mixed ester	Technical	Clear transparent liquid	40	1.210 ± .005	0.01 (3)	99	30	1.560
CELLUFLEX* DOP dioctyl phthalate	Technical	Clear transparent liquid	50	0.986 ± .002	0.01 (2)	98	—	1.485

(1) @ 60° C. (2) % as phthalic, max. (3) % as phosphoric, max. (4) molten

Celluflex 179C—tricresyl phosphate, commercially developed by Celanese—is the standard of comparison among flame-resistant plasticizers for electrical applications. It has very low volatility, excellent solvent power, a high degree of permanence ...producing tough flexible vinyl coatings for transformer wires and electrical cable.

Celanese, pioneer in the production of petroleum-based and coal tar-based tricresyl phosphate plasticizers, today offers an expanding list of Celluflex plasticizers designed to fit a broad range of applications. Celanese Technical Service and Application Laboratories are fully equipped to assist you in formulations and test. Bulk stocks of Celanese Plasticizers are maintained at centrally located distribution points for prompt delivery. Wire manufacturers can take advantage of price differential and freight saving by ordering combination shipments—compartmented tankcars, tankwagons, or mixed drum carloads.

Celanese* CHEMICALS

Celanese Corporation of America
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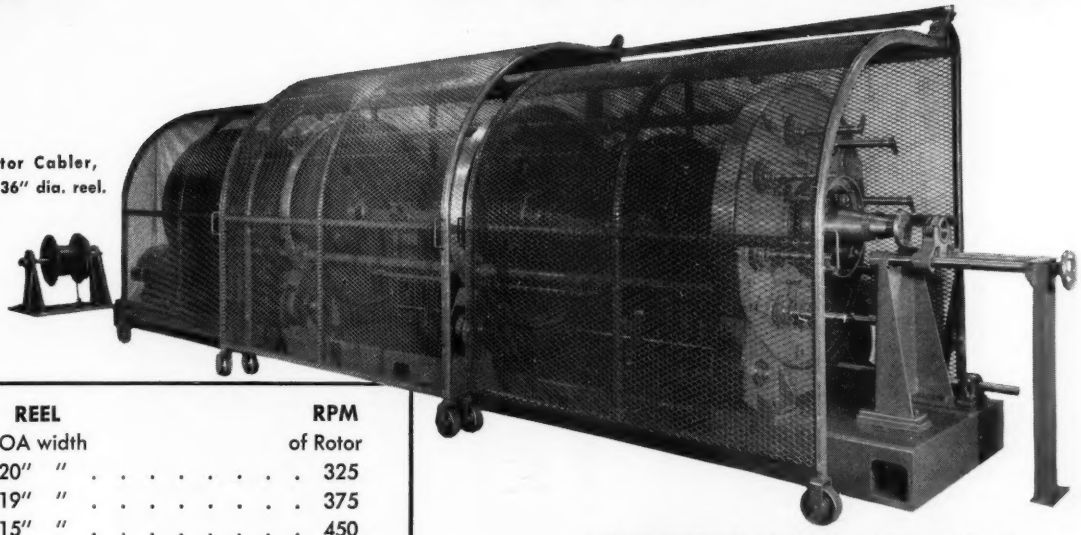
NEW HIGH SPEED CABLER

CAGE TYPE

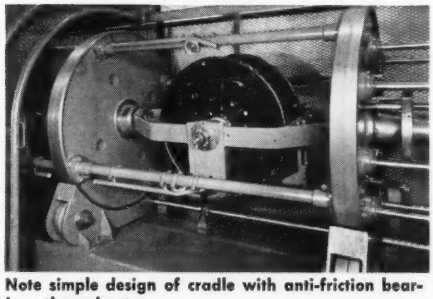
. . . for 2, 3, and 4 conductors



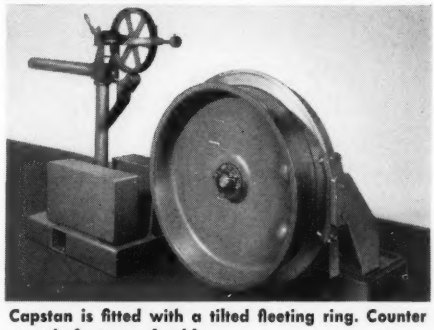
4-conductor Cabler, 3 bay, for 36" dia. reel.

REEL Dia. x OA width	RPM of Rotor
36" x 20" "	325
30" x 19" "	375
24" x 15" "	450

Engineered and built for fast production of uniform high quality cables, these new Nebuttco Cablers are the last word in twisting machines. Their rugged, accurate construction assures maintenance-free service even under heaviest production schedules. A wide selection of auxiliary attachments is available, including jute filler spindles, binder head, cotton serving head, tape head, measuring wheel, and take-up reel stand with adjustable traverse. Ask us for further information and prices. New England Butt Company, 304 Pearl Street, Providence 7, R. I. James Day (Machinery) Ltd., 28 Maddox St., London W1, England.



Note simple design of cradle with anti-friction bearings throughout



Capstan is fitted with a tilted fleeting ring. Counter records footage of cable.

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The Wire Outlook

A number of factors in the business outlook justify optimism. The general decline in business volume has been moderate—no worse nor better than anticipated at the close of the year; the slide in farm prices over the past three years has halted; and the bottom of the down-trend in steel demand appears to have been reached.

The financial position of the great majority of the nation's businesses is considered to be impressively strong, a fact that has been attested by the current strength of the stock market, which has been reflecting both the confidence of investors and the improved financial status of companies whose securities are listed on the exchanges.

For the steel industry, more capacity, more jobs and better working conditions are seen for 1954. The industry is planning to spend 775 million dollars this year for plant improvements. In the wire industry it is gratifying to note that the non-integrated mills are enjoying a resurgence of business after the months of quietness and doubt through the last half of 1953.

The easy-money policy, abandoned early in 1952, is now back in full force, so that businessmen are able to get all the credit they can use at lower discount rates. As a matter of record, the banks have plenty of money to lend, with a constantly lessening demand for it, because of decreased need. This is tangible evidence of what lowered taxes will do. Higher "take-home" pay for corporations and individuals provides good hard cash spending ability where it does the greatest amount of good.

The New and Fair Deals' policy was to hamper business, seeking prosperity by taking money away from the "haves" and pouring it into the hands of the low-income groups for spending. The incumbent Administration's formula for good times is to stimulate business and thus provide prosperity for all. Punitive taxes on business are to be eased or ended.

Copper is in ready supply. From 1950 well into 1953 there had been a shortage. The condition has been reversed, prices have become fairly stable and there is now enough to go around, in spite of the increase in consumption that marked the end of price and allocation controls, when monthly consumption rose from an average of 123,000 tons to 138,000. More copper is being purchased at home and more is being imported.

The belwether of business, the automotive industry, is looking forward to a good year, with approximately 5½ million units scheduled to be built. The building industry will receive a shot in the arm through a lowering of the down payments required and longer mortgage terms. These two industries, if their present pace is continued, will help to keep the general activity of business at satisfactory levels.

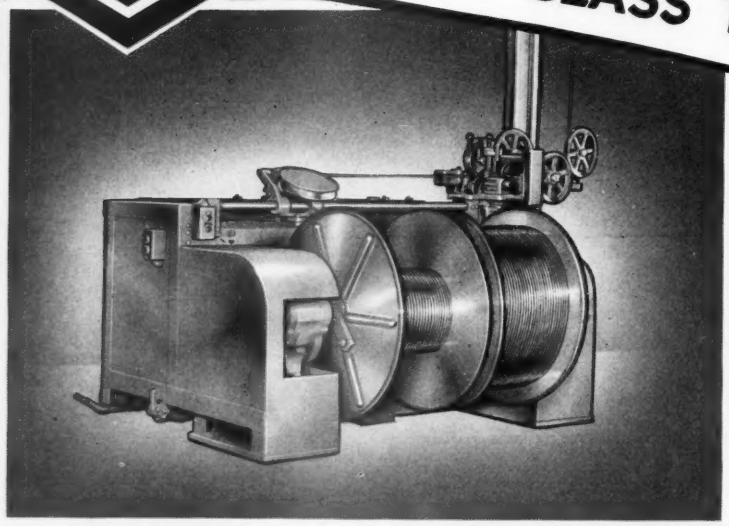
Merchant wire products, anticipating the needs of the farmers in the Spring, are now moving well. Manufacturers' wire is moving more slowly and on a hand-to-mouth basis. Nail stocks are high with the producers, but dealers' stocks are low. With the expected increase in the number of building jobs in the Spring, nails should begin to move. Production of cold heading wire has long since passed demand but the latter is increasing and orders from most sources can be filled promptly. It is reported that imported wire is arriving in ever-growing volume.

Industry is reacting positively to the changed official attitude of Government. The auto industry is planning for major plant improvements and extensions. The chemical industry has big plans underway. Utilities are expanding their facilities. The emphasis in business is no longer on the hoarding of liquid cash, but to spend for plant improvements to lower production costs.

A recent survey by Dun and Bradstreet among over 1,300 top executives shows 46% expecting a second quarter ahead of the strong 1953 April-June period, 22% anticipating a decline and the balance looking for little change. The balance of the year looks solid and promising.

—from the Editor's Desk

AUTOMATIC DUAL TAKE-UP CLASS T



THE FIRST COMPLETELY AUTOMATIC TAKE-UP IN THE WIRE FIELD FOR EXTRUDER OR CONTINUOUS VULCANIZING MACHINES

CHECK THESE OUTSTANDING FEATURES!

- Fully Automatic Operation - Operator needs only to replace reel when automatic visual and audible signal indicates it is fully wound.
- Take-Up Speed Automatically Controlled - Driven by and synchronized with Extruder or Continuous Vulcanizer.
- Built-In Pneumatic Lift - Lowers full reel and lifts empty reel into position.
- New Traverse Mechanism - Automatic high-speed wire transfer from full to empty reels. After change-over the traverse reverses, locking wire onto reel for cutting operation.
- Dual Take-Up - Available in three sizes to handle the following reel diameters, 18" to 24" O. D., 24" to 30" O. D., and 30" to 36" O. D. All stands will accommodate various reel widths.

See page 311 for a complete listing of JLE Products for the Insulated and Bare Wire Industry.

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WIRE
AND WIRE PRODUCTS

A monthly publication devoted to the production of Wire, Rod and Strip.
DRAWING — ROLLING — EXTRUDING — FORMING — FABRICATING

Vol. 29 MARCH, 1954 No. 3

Continental Steel Corporation's New High Speed Rod Mill

by D. C. Horsman, Superintendent, Steel Division
Continental Steel Corporation
Kokomo, Indiana
and
A. Wilson, Chief Roll Designer
United Engineering & Foundry Company
Pittsburgh, Pennsylvania

Continental Steel Corporation recently installed and placed into operation at Kokomo, Indiana, a United Rendlemann Rod Mill that incorporates in its design some excellent new features. This mill embodies in its construction the latest known electrical and mechanical developments and utilizes automatic mechanisms to perform many additional functions in the process of rolling and handling the rods.

★ ★ ★

In installing this mill, every precaution was taken to provide for production of the highest quality of rods possible, and a coil weight is produced. That will allow efficient operations in subsequent processing. Years ago, wire mills were content with rod bundles weighing

The rod mill recently put into operation by Continental Steel has been the subject of much interest, as it embodies some brand new ideas and is said to be capable of increased finishing speeds. We are therefore glad to be able to publish a detailed description of it here.

200 to 300 pounds. Little or no attention was paid to size variations, internal structure or surface condition, since rods were used chiefly for the manufacture of nails, fence, barbed wire, and other common products.

★ ★ ★

In recent years, the requirements for wire and rods have become increasingly more exacting and more difficult to maintain, as manufacturers have sought ways to decrease the cost of their products by forming or stamping many parts from wire that were formerly machined from steel bars. These demands now require wire of a higher quality to withstand these forming operations. Surface condition becomes extremely important to satisfy the plating requirements of to-day's market; seams and internal weaknesses must be eliminated to provide good cold forming qualities; and uniformity of temper requires that size variations be held to a minimum and stretching of the bar be eliminated. All of these factors, and many more, were considered in selecting and designing the mill for Continental Steel Corporation, to produce high quality rods in coil weights up to 600 pounds.

★ ★ ★

This mill is a three strand mill, with 22 mill stands, and equipped

Figure 1. Interior View of Rod Mill

with both laying and pouring reels. A complete range of sizes from 7/32 inch up to 43/64 inch in diameter is now rolled, with provision for future rolling up to 1⅛ diameter rounds or equivalent cross sections. A 2½ inch square billet is used and the size of the finished rod determines the number of mill stands that are used and the finishing speed of the rod. Four rod sizes from .218″ to .243″ are rolled from stand 22. Four sizes of rounds between .250″ and .281″ are rolled from stand 20. Seven rod sizes between .296″ and .375″ are rolled from stand 18. All of this production is coiled in the laying reels. Rods coiled in the pouring reels are finished either in stand 16 or stand 15. Five sizes of rounds are rolled from stand 16, between .350″ and .406″ diameter. Four rod sizes between .437″ and .531″ are rolled from stand 15, with stand 13 blanked. Five rod sizes from .562″ to .672″ are finished out of stand 15 with #9, 10 and 13 blanked.

★ ★ ★

In order to roll three bars simultaneously and still maintain extreme accuracy, special roll turning tools were provided and extreme care was exercised in selecting electrical and mechanical features to be used in the mill. All roll necks are equipped with antifriction bearings. Roller bearings are used to take radial loads and double row ball bearing assemblies are used to withstand thrusting and to maintain proper vertical alignment. Guides are carefully ground to exact template contours and roller twisters are provided to eliminate scratching of the rods, which frequently occurred when friction guides alone were used. Each stand is equipped with hydraulic roll balances, which keep the rolls separated under extreme pressure and eliminate the usual spring in roll assemblies which would otherwise be encountered when bars enter the rolls. The finest precision machined gears are employed throughout the mill construction, and precision fit antifriction bearings insure the proper alignment of these gears. In addition to making every provision for building a precision mill, much thought and effort was expended in incorporating a quality of ruggedness which would insure many years of successful operation.

★ ★ ★

Seven 600 volt D. C. drive motors with wide speed variation combine to provide 7,100 horse power for driving the mill. Regulating exciters are supplied for the auxiliary field of each motor, to minimize the impact speed drop which would otherwise cause the motors to become out of balance with each other. In addition, special characteristics were built into these motors to maintain steady speed regulation over the full range. Two 2,500 K.W. 600 volt generators supply the adjustable voltage D. C. power for these motors. Close voltage regulation of the main power bus is obtained by the interaction of the various fields of the regulating exciter. These fields provide reference to a set master voltage, balance, and stabilization of the voltage supply to the drive motors. These motors and M. G. sets, together with scores of automatic boards for auxiliary equipment, are contained in a pressurized motor room, that is continuously supplied with cleaned and conditioned air from special air cleaners.

★ ★ ★

Mechanical skids, known as a "bundle buster," operate in an extension of the billet yard from a common crane runway serving the billet mill cooling bed and the billet storage yard. This "bundle buster" automatically breaks the bundles of billets apart, lines the billets up alongside of each other

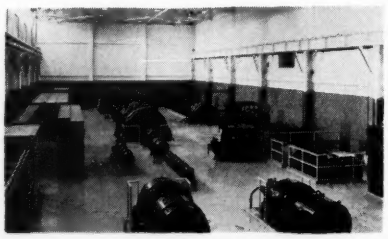


Figure 2. General View of Motor Room

and places them on the furnace feed roller table. This table carries the billets into the side charge furnace where they are positioned by a furnace charging car.

★ ★ ★

The furnace is a single zone type, approximately 55 feet by 35 feet, fired from the discharge end. Combination natural gas and oil burners are used, and full automatic controls, regulate the temperature of the furnace, furnace pressure, and fuel-air ratio, providing

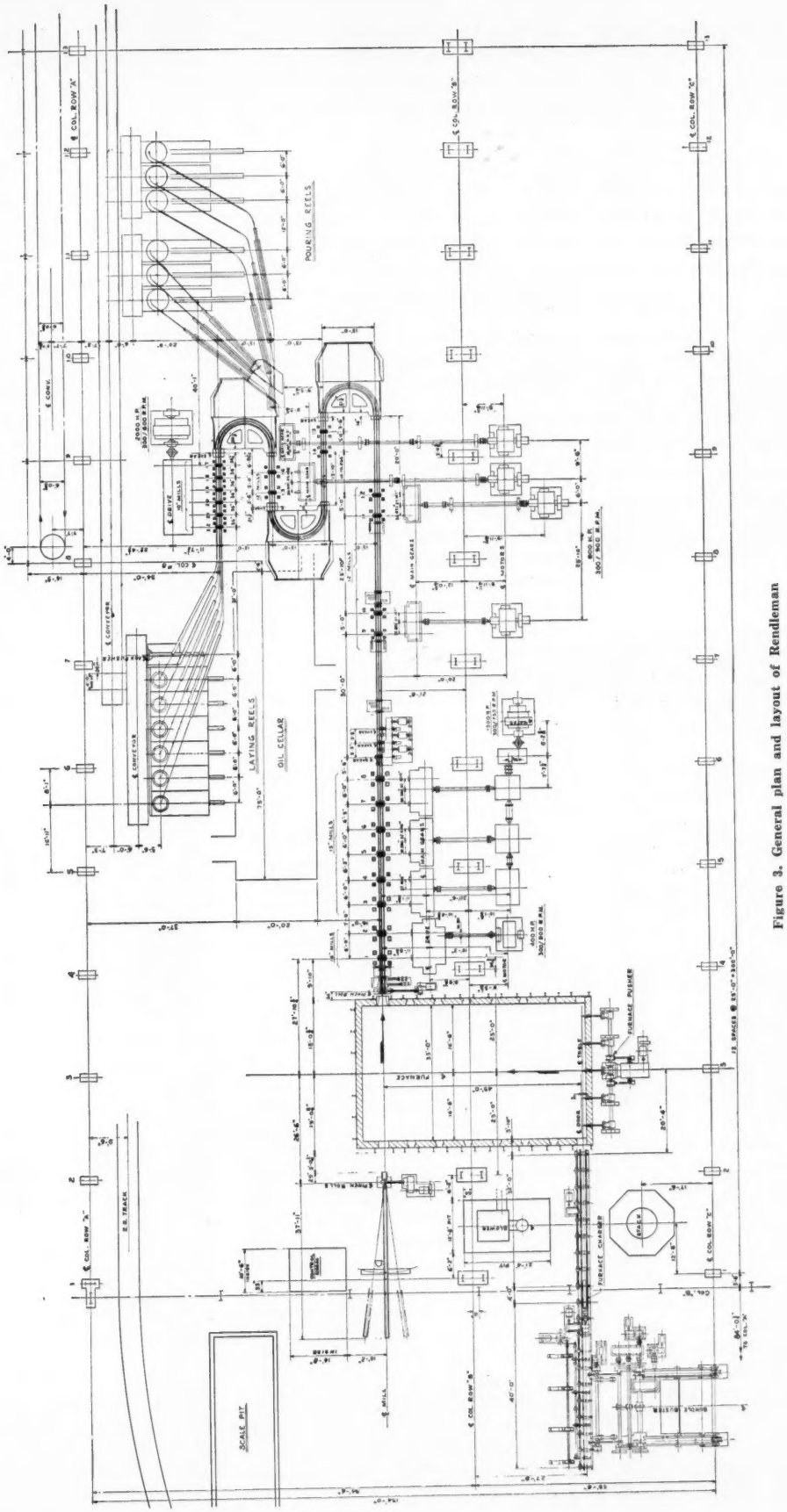


Figure 3. General plan and layout of Rendleman rod mill

a continuous chart of these factors, and, in addition, charting the temperature of gases leaving the furnace, the temperature of the preheated air, and the temperature of the stack gases. A high percentage of the sensible heat of waste gases is retained by the preheated combustion air supplied from the two pass metallic recuperator.

★ ★ ★

After the billets are heated to approximately 2000°F., they are pushed from the furnace by a conventional pusher bar into the first stand of the roughing mills. Each of the 3 lines is worked successively by application of an ingenious 3 strand switch table. The mill entering area also is provided with delivery pinch rolls and air operated billet shears as auxiliary tools.

★ ★ ★

The roughing train consists of two 16 inch mills and six 15 inch mills, with each group independently driven. Alternate diamond and square passes are used in these roughing mills to reduce the 2½" billet to a square which is slightly over ¾". The original billet, which was 30 feet long, is then approximately 300 feet long, and the speed of the bar traveling through the mill has been increased from approximately 30 feet per minute to over 350 F.P.M. The elimination of all oval passes from the roughing train has been an important factor in eliminating seams from the finished product, since the diamond-square reduction series permits the working of all four surfaces of the bar simultaneously, and the effect produced is to elongate any seams present by each successive reduction, with a corresponding decrease in the depth of the seam, until the seams cannot be found in the finished product. This has been proven to produce a much more sound product than most previously used reduction series, which often tended to roll the seams in and actually produced structural weaknesses in the finished rods.

★ ★ ★

After passing through the roughing mills, the front end of each bar is automatically sheared to present a clean end for subsequent rolling. The purpose of cropping the front end of each bar is to facilitate its entry into the last fourteen stands, and thereby reduce cobbles and delays to the operation. This shear is known as a flying shear, since it cuts while the bar is traveling at its normal pace. Three such shears are used at this location, one for each strand being rolled. This feature is unique among all steel rod mills, this mill being the only such mill having an individual shear for each strand.

★ ★ ★

Following the flying shears are eight 12" mill stands, known as the intermediate train. These stands are arranged in pairs, with each pair, known as "duo mills," driven by a separate motor. Oval, square, and round passes are used in the intermediate train to reduce the bar to a round, slightly over 11/32 inch in diameter. Spaces are provided between each pair of stands so that a free loop can form, thus relieving any rolling strains which may have developed. Since the mill layout is not in a straight line, it is necessary to repeat the bar or reverse its direction. There are three 180 degree repeaters in this mill.

★ ★ ★

These repeaters are curved troughs to guide the bar from one stand to another while reversing the direction of travel. A free loop is thus formed which is allowed to grow slightly in length on the repeater table. Since the first two sets of duo mills are in a straight line, it is necessary to accomplish this looping action by means of "down loopers," which are straight troughs which guide the front end of each bar between the duo stands. When the passage of the front end has been completed, the trough is automatically turned over, which allows the loop to spill out. Thus this mill has been provided with five such loops which eliminate the stretching action often found in many older mills. This feature makes it possible to roll rods which are virtually the same size from the front end to the back end of the coil and extremely close tolerances can be maintained. The speed of the bar leaving the intermediate train has been increased to approximately 2,000 feet per minute, and the bar is then approximately 1900 feet long when finishing .218" rounds in stand 22.

★ ★ ★

When rolling the smaller rounds, the bar travels around a 180 degree repeater from number 16 stand and into the 6 stand 10" finishing train. Oval and round passes are used in the finishing train to reduce the bar to .218" round. A 2,000 H.P. motor drives the six stand finishing train through a precision gear set, so that .218" rounds are produced at a speed normally set at 5,000 feet per minute, although the mill can and has operated at 5,750 feet per minute, or over a mile a minute. Since there are three bars in the mill simultaneously, the mill is actually producing three miles of .218 inch rods per minute. Each individual 2½ inch billet, which was originally 30 feet long, has been reduced in cross section to a .218" diameter round, which is approximately 4,700 feet long.

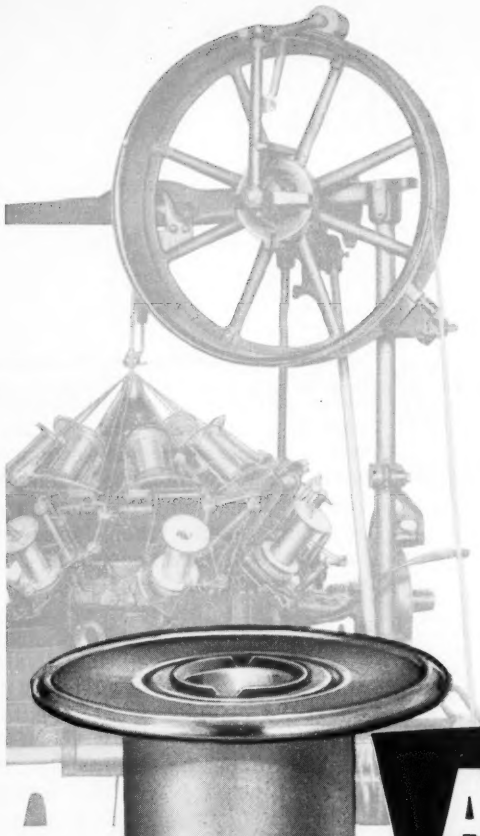
★ ★ ★

Each of the three strands of rods coiled by the laying reels is served by two coilers with the hot rods from each strand alternately directed from one coiler to the other by means of an automatic switch. The hot rods travel from the switch to the coilers through a high pressure water descaling system which facilitates the obtaining of the improved surface quality. After the coiling has been completed in one of the six laying reels, the coil is automatically discharged from the coiler on the conveyor system composed of five conveyors. The transfer of the coil from one conveyor to another is automatically accomplished, and sufficient time is allowed for the coil to cool before it reaches the unloader at the rod storage building.

★ ★ ★

When finishing larger rounds in the pouring reels from stands 15 or 16, another series of descaling troughs is used between

(*Please turn to page* 342)



New Braider Spool Improves Braiding Efficiency

A new lightweight precision *aluminum* BRAIDER SPOOL—stronger and only 1/3 the weight of old spools you are now using—will be made immediately available for Wardwell Braiding Machines. It combines ACROPAK'S experience in the manufacture of precision spools with Wardwell's experience in the making of Braiders.

Here's what you get!—a *stronger* spool with a better spindle fit, greater concentricity, greater accuracy and only 1/3 the weight. You can fill these spools to capacity without breakage. The head is an integral part of the barrel—no cracks—no separation. Edges of flanges are burnished smooth for easy wire take-off.

These new spools improve efficiency, reduce breakages and increase production. Available either from Acrometal Products, Inc., Minneapolis, Minn., or Wardwell Braiding Machine Co., Central Falls, R. I.

ACROPAK* collaborates with WARDWELL BRAIDING MACHINE CO. to produce a *better* BRAIDER SPOOL

*Reg. U.S.T.M.

Two sizes: short traverse for 16 carrier, long traverse for 24 carrier.

- Welded aluminum—⅓ the weight!
- No cracks between head and barrel.
- Fills to capacity without breakage.
- Special sleeve with drive slots designed for Wardwell spindles.
- Polished flange edges for easy wire take-off.

ACROMETAL PRODUCTS, INC.
Division U S Bobbin and Shuttle Co.,
616 Fifth Street N., Minneapolis 1, Minn.

Exhaust Nuisance Abatement With Activated Carbon

by Kevin B. Magee, Consulting Engineer
Danbury, Connecticut

With the problem of air pollution from process gases discharged into the air faced by so many concerns, this article is published as an aid to the possible solution of this vexing question.

Industrial and chemical plants which have relocated in suburban or semi-rural residential areas have frequently found that they have unwittingly created air pollution problems by discharging their process gases to the surrounding atmosphere. The **Ace Wire Mills, Inc.,** Paterson, N. J., had such a problem.

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This company manufactures copper transformer wire which is coated with synthetic lacquer, baked on after an immersion bath. The ovens are arranged in tandem with individual stacks venting to the atmosphere. Baking temperatures are about 650 degrees F. in order to burn off all combustible gases and most of the solids in the lacquer solvents.

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It was established soon after the plant was completed that the stack effluvia contained some odorous non-combustible gases and solids that were causing a serious neighborhood nuisance. At the time the management decided to install catalytic burners to eliminate the odors by completely burning all effluent gases and solids. The complaints continued however, though a slight decrease in the odor level was noticed. The situation was brought to a head by the local health department which advised immediate action.

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At this stage the Ace Mills called in the writer to decide the best means of abating the nuisance at reasonable cost and without interrupting or interfering with production. Our first approach to the problem was to obtain a qualitative analysis of the lacquers and solvents employed. From this point it was determined that the gases generated by the process were of a nature readily adsorbed by activated carbon. Other methods of masking or "neutralizing" odors were, of course, considered but in each case were found to be unsatisfactory due to a combination of reasons, among them excessive weight, bulkiness, cost and complicated control and operation.

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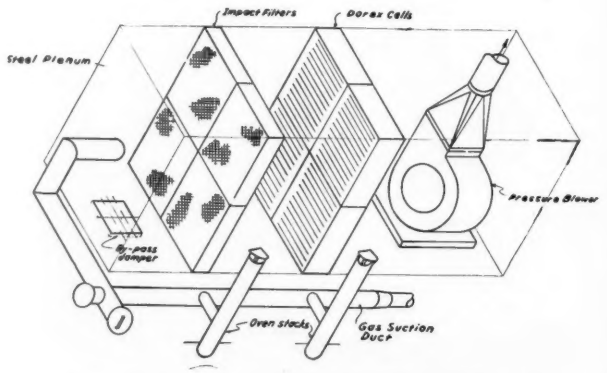
The next step was ascertaining the quantity of gases emitted by all the ovens operating simultaneously and continuously. This was found to be approximately 250 CFM. Since for optimum adsorption efficiency air passing through activated carbon equipment should not exceed 118 degrees F., this temperature was established as the maximum through the system. Hence it became necessary to dilute the stack gases with 5750 CFM of 95 degree F, plant air in order not to exceed the 118 degree limit and this in turn established 6000 CFM as the total air to be handled by the exhaust blower. Activated carbon cell-type units,

(*Please turn to page* 340)



Above: Schematic Arrangement of Ace Wire Mills purifying unit. * *

Left: Lou Stark, plant engineer, examines one of the dust filters which protects the activated carbon cells. * * * * * * * * * *

Discussion on Precision Spring Design

by M. Gerard Fangemann, General Manager
John Chatillon and Sons
New York, New York

PART II

This dissertation on spring design was delivered by the author at a meeting of American Society of Mechanical Engineers in New York on October 6th. It contains the results of much research work and treats of many design aspects on which material has not previously been published. Due to its length it will be published in three parts, of which this is Part II.

One of the most important characteristics of precision springs for accurate applications is called "Mechanical Hysteresis." This characteristic is well-known in the scale industry under the name of back-error, and it describes the lag in the deformation of an elastic material during the removal of a previously applied load. A typical hysteresis loop is shown on our demonstration board, and the difference at the mid-point AB is designated as the "hysteresis error." If we were to load springs to half load, and then to full load, then back to half load, and finally return to zero, and were to plot the load against deflection, a curve would be obtained which is called the "hysteresis loop." You will note that this curve begins at zero and ends at precisely the same point. However, the two halves of the curve coincide only at zero in full-load position.

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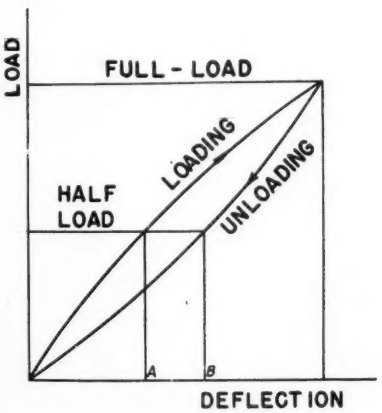

HYSTERESIS CURVE

The loop has been exaggerated for clarity. Actually the distance AB in precision springs is a minute quantity, generally of the order of .005". As far as I know there is no completely satisfactory explanation of the loop. If the spring material adhered exactly to Hooke's Law of Proportionality of load and deflection below the proportional limit, the loading and unloading curves would be straight lines and would coincide, hence the loop would not exist. It would appear that since loading and unloading curves are not straight lines, actual spring materials are not truly elastic even when stressed below the nominal proportional limit. Now, the phenomenon of the hysteresis loop is a familiar characteristic when the material is highly stressed, for example, above the elastic limit. If, as recent investigations seem to indicate, ductile materials such as steel have a very low precise elastic limit, or none at all, a hysteresis loop would occur at low stresses, although of course it would be a very minute loop. When one considers that metal structure is not uniform, that the individual grains are oriented in all directions, and also that the value of the modulus of elasticity in a grain varies considerably depending on the direction of loading, it is not surprising that the load-deflection relation is not precisely linear.

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The magnitude of hysteresis error depends on the materials used. For the usual spring materials hysteresis error varies between .1% and .2% of the total deflection at normal temperatures. For high grade spring alloys, hysteresis error is considerably less, and for Iso-Elastic it would amount to a maximum of .02% of total deflection.

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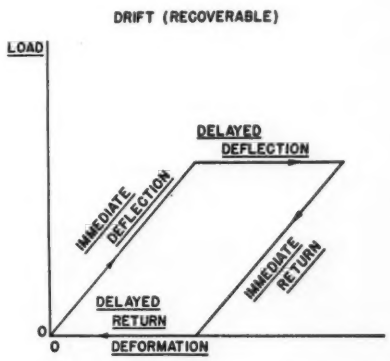
Another important characteristic of precision springs, and one that is not usually written about to any great extent, is a peculiar property called drift. Weber was



the first to notice, back in the 1800's an effect he called the "elastic after-effect." That is, after removing a force from a spring, he noticed that the deflection did not return to zero immediately as expected, but that a delay occurred. The spring approached the original unloaded position after a lapse of time.

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Whenever a spring is loaded continuously for an appreciable length

of time, it undergoes two types of deflection simultaneously. The first takes place immediately with the application of load and the spring reaches stability. However, if accurate measurements are made, a second, or delayed, deflection called drift will be noticed taking place. This additional deflection may continue for minutes, hours, or days.

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Actually the term drift includes two different kinds of deformation, an elastic-type or recoverable one, and a viscous or irrecoverable one. The relative amounts of the two types depend on the material and the temperature. The first is the one which Weber first described, as just mentioned, and is shown diagrammatically on the demonstration board. Here you will notice that after the first immediate deflection due to the load applied, a delayed deflection, represented by the horizontal line indicating constant load, takes place. Now, when the load is removed there will be an immediate return of the spring, but with a finite set. After a period of time this set disappears and recovery is complete. The material behaves almost as if it retains a memory of its initial condition, and attempts to restore itself there.

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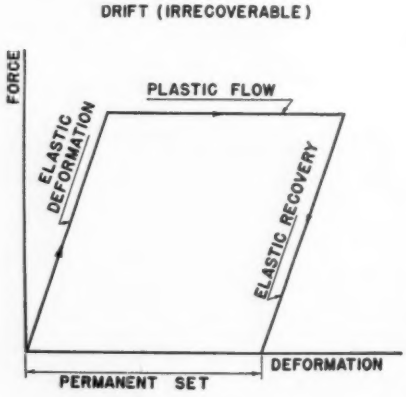
The second type of drift is a viscous flow of the material. A



good example of this type of action occurs when a heavy weight such as a bowling ball is placed on cold tar. The weight represents the steady applied load. As time goes on, the weight will sink at a rate which is governed by the temperature. In a spring material the main characteristic of viscous flow is that there is no tendency toward recovery; the deformation remains permanent. This action is shown diagrammatically on our demonstration board, and you will note that after the first immediate deflection, due to load being applied, a viscous deflection takes place (represented by a horizontal line indicating constant load). Now, when this load is removed there will be an immediate return of the spring, but with a finite set. This set, however, unlike the one just described, is permanent. The relative amounts of the two types of deformation occurring together depend on the material, the working stress, and the temperature. At normal temperatures spring materials are highly elastic and exhibit relatively small amounts of viscous effects. In fact, in the highest grade of modern spring alloys, such as Iso-Elastic, the viscous deviations from Hooke's Law are extremely small.

	DRIFT IN 1 HOUR	DRIFT IN 24 HOURS
SPRING STEEL	0.08 %	0.30 %
ISO-ELASTIC	0.01 %	0.06 %
SPRING STEEL (1/2 LOAD)	0.02 %	0.065 %
ISO-ELASTIC (1/2 LOAD)	NOT DETECTABLE	0.01 %

	CREEP AT 200 F	CREEP AT 500 F
SPRING STEEL	0.25 %	5 %
ISO-ELASTIC	0.02 %	0.1 %

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Typical values of drift for weighing scale springs, given in per cent of deflection, are as follows:

		Drift in 1 hour	Drift in 24 hours
Full Load:	Spring Steel	.08%	.30%
	Iso-Elastic	.01%	.06%
Half Load:	Spring Steel	.02%	.065%
	Iso-Elastic	Not detectable	.01%

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When the temperature is above normal, there is a sharp increase in the drift, which is now of the viscous, or irrecoverable type, leading to a permanent set. Because of this, the drift is given a special name, creep. Below are given typical values of creep in per cent of deflection:

	Creep at 200°F.	Creep at 500°F.
Spring Steel	.25%	5.0%
Iso-Elastic	.02%	.1%

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From these tables it is rather evident that modern alloys offer remarkable advantages when elevated temperatures are encountered in design problems. These newer materials are called temperature-compensated alloys and their most important characteristic is a low thermal coefficient of the modulus of elasticity.

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The thermal coefficient of the modulus of elasticity determines the change in rate of the spring, resulting from change in temperature. Ordinary spring steel, for example, has a temperature coefficient of -190 x 10^{-6}/°F., whereas specialized materials such as Iso-Elastic have a range between -15 x 10^{-6}/°F., to +10 x 10^{-6}/°F. for their temperature coefficients. The plus or minus sign preceding the thermal coefficient designates the direction of change. For example, the "minus" sign designates a weakening of the spring with increase in temperature, whereas the "plus" sign indicates that the spring would stiffen with increase in temperature. For spring steel E = 30 x 10^6 psi at ordinary temperatures. Now assume a temperature rise of 200°F. The modulus of elasticity at 200°F. therefore becomes 30 x 10^6 - 380 x 10^4 (30 x 10^6) = 30,000,000 - 1,140,000 = 28,860 psi.

MATERIAL	TEMPERATURE COEFFICIENT OF MODULUS OF ELASTICITY /°F
SPRING STEEL	− 190 X 10^{-6}
CHROME VANADIUM	− 146 X 10^{-6}
PHOSPHOR BRONZE	− 200 X 10^{-6}
BRASS	− 216 X 10^{-6}
BERYLLIUM COPPER	− 194 X 10^{-6}
ISO ELASTIC	− 15 X 10^{-6} TO + 10 X 10^{-6}

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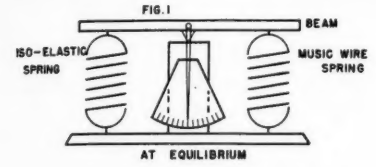
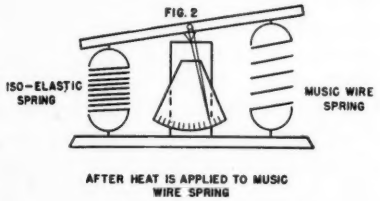
As a matter of interest we think it might be worthwhile to demonstrate the effects of temperature

on springs, since a visual demonstration will certainly prove to be more effective than mere words.





Here before you is a balanced beam supported at its center by means of a knife edge. Attached to each end of the beam is an extension spring. The one on the left is made of a temperature-compensated material, and the spring on the right, in this particular case, is a spring made of music wire. Both of these springs have exactly the same rates, and both springs are in equilibrium. You will note that the beam moves at the slighest change in deflection of either spring. If the spring on the left changes in strength the deflection will change and consequently the beam will move. Any slight movement of the beam is magnified and will be clearly visible, as indicated by the pointer.

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Now, suppose we heat the springs with this hair dryer. As the blower is turned on, air is forced out of the orifice, but it is pre-heated first by means of the heating element. If we are to blow this warm air onto a temperature-compensated spring and heat the spring material, any change in strength will be indicated by the movement of the pointer. You will note that the pointer does not move with prolonged heating of the temperature - compensated spring, which indicates that the spring rate remains constant with increase in temperature.

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Now, if we were to heat the music wire spring in the same manner, you will note that almost immediately the pointer begins to move in a direction indicating that the spring is deflecting more with increased temperature. In other words, the spring rate is becoming weaker, which means that the Modulus of Elasticity is becoming less with increase in temperature.

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Conversely, if we were to cool or lower the temperature of the Iso-Elastic spring by spraying with ethyl chloride, no change in strength would be noticed. If, however, we cooled the steel spring in a like manner, the pointer would move in the direction indicating that the steel spring became stronger with decrease in temperature. I believe it is obvious from this demonstration, therefore, that the effects of temperature on the usual spring materials are considerable.

★ ★ ★

We mentioned earlier that Hooke's law states that the relationship between load and deflection is proportional within the elastic limits. Investigations by Sayre and DeForest have proved that a deviation exists in helically wound springs. This deviation is called "Straight-Line Error." Sayre and

SAYRE - DeFOREST DEVIATION FROM STRAIGHT LINE

A) DEFLECTION = $H - H_0 = \frac{PR_0^2 L}{GJ} + \frac{PR_0^2 H_0^2}{GJL}\left(2 - \frac{GJ}{E\Sigma}\right) + \frac{KLP}{AG} - \frac{PR_0^2}{3GJL}\left(3 - \frac{2.4G}{E\Sigma}\right)(H^2 + HH_0 + H_0^2)$

WHERE A = AREA OF CROSS SECTION OF WIRE
K = CONSTANT = 1.11 FOR CIRCULAR SECTION
= 1.20 FOR RECTANGULAR SEC

B) DEVIATION = $-\frac{PR_0^2}{3GJL}\left[3 - 2\frac{GJ}{E\Sigma}\right]\left[H^2 + HH_0 - 2H_0^2\right]$

J = POLAR MOMENT OF INERTIA
H = FINAL LENGTH OF ACTIVE COILS
H_0 = INITIAL LENGTH OF ACTIVE COILS
R_0 = MEAN RADIUS OF SPRING $\frac{D}{2}$
L = LENGTH OF WIRE IN SPRING

DeForest proved by mathematical analysis that this error can be brought under control when the spring is properly proportioned, making use of rectangular section material. The equation for straight-line derivation derived by Sayre is illustrated on our screen and is, as you see, a very complicated equation.

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Today design engineers are especially concerned with straight-line characteristics of springs, especially for force-measuring devices such as those used in aircraft and weighing scales. Here too we will not work out the derivation or an illustrative problem. These will be submitted to you later. We might point out that if sufficient space is available, a round-wire spring could be made that would have "zero" straight-line error.

★ ★ ★

A precision extension spring in the truest sense would be one that is accurately calibrated to extremely close tolerances, that has practically "zero" straight-line error as well as negligible hysteresis and drift errors, and at the same time is unaffected by variations in temperature. Such a spring is possible, and, as a matter of fact, such springs are being made daily without too much difficulty.

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Suppose we now change over to the design of compression springs, since compression spring design makes use of the identical equations for calculating stress and number of active coils as were used previously for extension springs. A compression spring is a helical spring that is coiled with space between coils and offers resistance to compressive forces. Compression springs are usually made from three main shapes of material, namely round, square, and rectangular section wire. The usual types of compression springs have a uniform outside diameter throughout their entire length.

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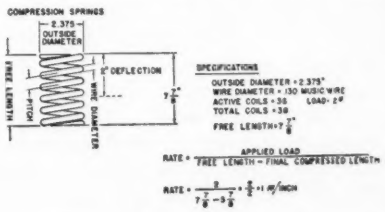
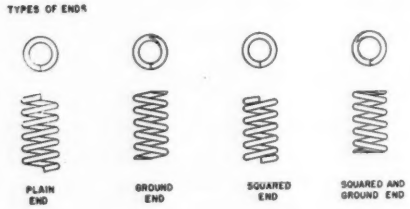
We have before us three typical compression springs. Specifications for the first spring are illustrated on our screen. You will note that the ends of this first spring are closed and ground square, and the rate of the spring is 1 lb. per inch. In other words, if we apply


COMPRESSION SPRINGS
2.375 OUTSIDE DIAMETER
1" DEFLECTION
FREE LENGTH
PITCH
WIRE DIAMETER
SPECIFICATIONS
OUTSIDE DIAMETER = 2.375"
WIRE DIAMETER = .130 MUSIC WIRE
ACTIVE COILS = 36
LOAD = 2"
TOTAL COILS = 38
FREE LENGTH = 7 3/8"
RATE = APPLIED LOAD / FREE LENGTH - FINAL COMPRESSED LENGTH
RATE = 2 / 7 3/8 - 5 3/8 = 1 lb/INCH

a 1 lb. load to this spring, we will obtain a deflection of 1". If we apply an additional pound we obtain a total of 2" deflection. Compression springs are made with many

different types of ends. Springs can be coiled with a uniform pitch throughout the spring, in which case the ends will be specified as "plain ends." If this same spring



were to have its ends ground, then the ends would be specified as "ground ends." Compression springs can also be coiled with the end coil closed, in which case the ends would be classified as squared ends. Now, if the ends of this squared-end spring were ground, then the ends would be specified as squared and ground ends. Illustrated on our screen is a chart showing the formulas for calculating the solid height, the number of total coils, the pitch, and the free length for compression springs having various types of ends.

COIL LENGTHS FOR VARIOUS SPRINGS

TYPE OF END	N_0 (SOLID HEIGHT)	N_t (TOTAL COILS)	P (PITCH)	FL (FREE LENGTH
PLAIN	$d(N_t+1)$	N_a	$\frac{FL-d}{N_a}$	pN_a+d
GROUND	dN_t	N_a	$\frac{FL}{N_a}$	pN_a
SQUARED	$d(N_t+1)$	N_a+2	$\frac{FL-3d}{N_a}$	pN_a+3d
GROUND AND SQUARED	dN_t	N_a+2	$\frac{FL-2d}{N_a}$	pN_a+2d

N_t = TOTAL COILS N_a = ACTIVE COILS d = WIRE DIAMETER FL = FREE LENGTH OF SPRING p = PITCH OF SPRING COILS

Getting back to our first sample compression spring, you will note that the number of active coils changes with increased deflection. In other words, as the load is applied, the resulting deflection causes the last active coil at each end to partially close up solid with the result that the number of active coils in the spring decreases, causing the rate of the spring to increase. Naturally the rate will continually change throughout compression by a slight amount. For example, the rate of this sample spring for the first half inch of deflection is 1# per inch, whereas the rate for the last half inch of deflection has increased to 1 lb., 3 oz., per inch.

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Although for this particular spring, the change in rate in compression is negligible, it would be very pronounced for a spring having a stiffer rate. For example, here is a spring that has a rate of 65#/" according to design, taking into account the actual physical dimensions. However, in compressing the spring its normal deflection in use, the rate increases to 67.8/#", because the number of active coils changes from 113 to 112½ during total compression.

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In late years the change in rate during deflection has become quite important for applications requiring good straight-line relationship between load and deflection. Because of this ever-increasing requirement for greater accuracy for precision products, compression springs are now made that have the same number of active coils throughout loading. The second sample compression spring is an illustration of this type of spring, and you will note that there is a shim placed at the beginning of each active section of this spring, which insures the number of active coils remaining constant. These shims not only serve to maintain constant rate but also serve as a means of calibrating compression springs accurately. This type of spring can be accurately calibrated without difficulty to within 2% of the spring rate. If closer accuracy is required, then use is usually made of a calibrator as illustrated by spring #3.

★ ★ ★

Here we have a spring that is coiled with a uniform pitch throughout the length of the spring. Normally this would be considered a plain-end spring, since the ends are not closed or ground. If we were to insert a calibrator into each end of the spring we could calibrate this spring very accurately to a desired rate. As in the case of extension springs, the rate of the spring can be increased by turning in the calibrator, thereby decreasing the number of active coils. Conversely, by turning out the calibrator the spring rate is weakened, since we increase the number of active coils.

Compression springs made in this manner can be very accurately calibrated quite easily to a small fraction of 1% if necessary. If it is necessary to maintain the assembled length of the spring, then the calibrator can be machined to length after assembly. Usually it is better to have a calibrator of this type with a small machine-screw section on the end that can be used to adjust the length of the spring in assembly. The actual pitch of the thread is determined by the pitch of the spring and should be slightly greater than the pitch of the actual spring. This will insure the dead coil being seated firmly on the milled section of the calibrator in the free position. Consequently the number of active coils will remain constant throughout loading. The milling operation on this type of calibrator is very important, and must be accurately machined to close tolerances to obtain proper results.

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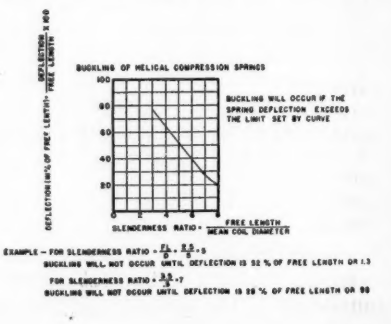
With regard to the usual compression springs, having a uniform diameter throughout their length, we might point out another factor that is important for good spring design. For a spring having a large deflection in proportion to its length an additional condition may occur that is called buckling. This effect is quite noticeable when the Free Length of the spring is more than five times the mean diameter. If such a spring acts inside a tube or over a rod buckling will not be too noticeable. However, in applications where there is no guidance for the spring, then extreme care is necessary to design springs with proper proportion to prevent buckling. We have drawn a curve which shows the design and operating limitations within which a compression spring can be used with-


BUCKLING OF HELICAL COMPRESSION SPRINGS
DEFLECTION IN % OF FREE LENGTH = K/D
DEFLECTION IN % OF FREE LENGTH
100
80
60
40
20
0
2
4
6
8
BUCKLING WILL OCCUR IF THE SPRING DEFLECTION EXCEEDS THE LIMIT SET BY CURVE
SLENDERNESS RATIO = FREE LENGTH / MEAN COIL DIAMETER
EXAMPLE – FOR SLENDERNESS RATIO = FL/D = 2.5/.5 = 5
BUCKLING WILL NOT OCCUR UNTIL DEFLECTION IS 32 % OF FREE LENGTH OR .8
FOR SLENDERNESS RATIO = 3.5/.5 = 7
BUCKLING WILL NOT OCCUR UNTIL DEFLECTION IS 20 % OF FREE LENGTH OR .90

out danger of buckling. This curve is illustrated on our screen. If a spring has a free length of 2½" and a mean coil diameter of ½", i.e., a slenderness ratio of 5, the curve shows that buckling will not occur until the deflection reaches 1.3" or 52% of the free length, whereas for a spring 3½" long with the same mean coil radius of ½", i.e., a slenderness ratio of 7, buckling will occur, when the deflection is only .98" or 28% of the free length.

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While on the subject of compression springs we might mention that compression springs are made in various shapes. The usual variation is a spring having a uniform taper, which is called a conical compression spring. Conical compression springs, such as this one, will have their rate increased with increasing deflection. In other words, if the spring is compressed, the larger diameter section deflects the most and with continued compression the larger diameter coils close on each other, thereby reducing the number of active coils, which increases the spring rate. Conical springs can be designed with a taper that will permit the springs to be compressed to one wire thickness, since each successive coil will fit into the next larger diameter coil until compressed solid.

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The design of conical compression springs makes use of the same basic equation for springs made with uniform outside diameter. For conical springs not having extreme tapers design can be simplified somewhat, making use of the average mean diameter of the spring. In other words, by adding the large spring diameter to the smaller spring diameter and dividing by two, and substituting this value in the spring equation used previously for uniform diameter compression springs, the number of active coils can be calculated. However, when calculating stress, substitute the maximum mean diameter in the equation for stress in order to obtain the maximum stress value.

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It should be pointed out that reliable results would be obtained with the method just described if no coil has bottomed while the load was being applied. If the nearest (largest) coil bottoms then a new mean diameter of active coils must be determined from the remaining active coils. These new values of D and N must then be used to obtain the deflection until the next coil bottoms, and so on.

CALCULATION OF DEFLECTION OF CONICAL SPRING

$$F = \frac{8PND^3}{Gd^4}$$ WHERE D = MEAN COIL DIAMETER

FOR MORE ACCURACY

$$F = \frac{2PN\left(C_2^4 - C_1^4\right)}{Gd\left(C_2 - C_1\right)}$$ WHERE C_1 = SPRING INDEX OF SMALLEST COIL, C_2 = SPRING INDEX OF LARGEST COIL

MAXIMUM STRESS

$$S_{MAX.} = \frac{PC_2K}{.4d^2}$$

For more refinement in calculating deflection of conical springs, another equation can be used in place of the standard formula

$$F = \frac{8\ PND^3}{Gd^4}$$

This equation is as follows:

$$N = \frac{FGd}{2P} \cdot \frac{C_2 - C_1}{C^4{}_2 - C^4{}_1}$$

where C_1 = Spring index of smallest coil

C_2 = Spring index of largest coil

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For stress, the standard equation for helical springs is used, namely,

$$Smax. = \frac{PC_2K}{.4d^2}$$

where K is the Wahl factor for spring index C_2.

★ ★ ★

Another variation of a compression spring is called a barrel spring. This spring can be considered as composed of two conical springs, each spring taking one-half of the total deflection with a given applied load.

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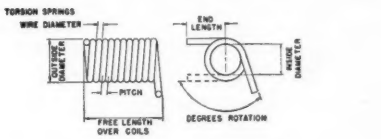
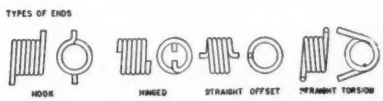
Suppose we now discuss another type of spring, namely, torsion springs. A torsion spring can be defined as a helically wound spring, usually made of round or rectangular section material, coiled open wound, which resists a torque applied along a circular arc. Extension and compression springs are subject mainly to torsion stresses, but oddly enough, a torsion spring is subject principally to bending stresses. The term torsion springs applies to many numerous types of springs, such as helically wound round wire torsion springs, flat coiled torsion springs, motor springs, and clock springs. Torsion springs, unlike other types of springs, vary considerably, one from the other. The types of ends vary considerably also, as illustrated on our screen, and are determined primarily by application.





DERIVATION OF STRESS FORMULA FOR TORSION SPRINGS

BEAM FORMULA $S = \frac{Mc}{I}$ WHERE M = APPLIED MOMENT = P X R_p

$c = \frac{d}{2}$

$I = \frac{\pi d^4}{64}$ FOR ROUND WIRE

SUBSTITUTING WE GET

$S = \frac{P X R_p X \frac{d}{2}}{\frac{\pi d^4}{64}} = \frac{32\,PXR_p}{\pi d^3}$ FOR ROUND WIRE

FOR RECTANGULAR WIRE OF WIDTH a AND DEPTH b

$c = \frac{b}{2}$ AND $I = \frac{ab^3}{12}$

$S = \frac{P X R_p X \frac{b}{2}}{\frac{ab^3}{12}} = \frac{6PR_p}{ab^2}$ FOR RECTANGULAR SECTION

STRESS FORMULAS INCLUDING CURVATURE CORRECTION FACTORS

ROUND WIRE $S = \frac{32\,PR_p}{\pi d^3} K_3$

RECTANGULAR WIRE $S = \frac{6PR_p}{ab^2} K_4$

★ ★ ★

By a long and involved derivation, it can be shown that the stress in a torsion spring is the same as if the spring were considered a cantilever beam having an applied moment at its outer end. Now for such a beam, the stress is as follows:

$$S = \frac{Mc}{I},$$

where M equals the applied moment, which is load P times moment arm Rp of the load,

$$c = \frac{d}{2}, \text{ and } I = \frac{\pi d^4}{64}$$

for round wire. Making these substitutions in the stress equation,

DERIVATION OF EQUATIONS FOR STRESS AND DEFLECTION - TORSION SPRINGS

(A) STRESS FORMULA

It can be shown by a long and involved derivation that the stress in a torsion spring is the same as if the spring were considered a cantilever beam having an applied moment at its outer end. For such a beam, the stress would be:

$$S = \frac{Mc}{I}$$

Where: M = Applied moment
= P x R_p
R_p = Moment arm of load applied
P = Applied load
K = Curvature correction factor

Substituting, we get:

For round wire $$S = \frac{PR_p \times \frac{d}{2}}{\frac{\pi d^4}{64}} = \frac{32PR_p}{\pi d^3} \times K_3 \qquad K_3 = \frac{4C^2-C-1}{4C(C-1)}$$

For rectangular wire $$S = \frac{PR_p \times \frac{b}{2}}{\frac{ab^3}{12}} = \frac{6PR_p}{ab^2} \times K_4 \qquad K_4 = \frac{3C^2-C-.8}{3C(C-1)}$$

(B) DEFLECTION FORMULA

As before, a torsion spring is equivalent to a cantilever beam with a moment load applied at its outer end. This same device is used to derive the formula for deflection of a torsion spring, which is the angle ϕ which the moment arm traverses during loading.

$$\therefore \quad M = EIK \qquad \text{Where: } K = \text{curvature of beam} = \frac{d\phi}{dL}$$

$$M = EI\frac{d\phi}{dL}$$

$$d\phi = \frac{M}{EI}dL$$

Integrating and noting $\frac{M}{EI}$ is constant, we get:

$$\phi = \frac{M}{EI} \qquad dL = \frac{ML}{EI} \text{ where } \phi \text{ is in radians}$$

For N coils,
Length L = πDN, and also 1 radian = 57.3° $\qquad \phi = \frac{57.3\,\pi DMN}{EI}$

For round wire $$\phi = \frac{57.3\,\pi DMN}{E\frac{\pi d^4}{64}} = \frac{3677\,DMN}{Ed^4} \text{ degrees}$$

For rectangular wire $$\phi = \frac{57.3\,\pi DMN}{E\frac{ab^3}{12}} = \frac{2162\,DMN}{ab^3E} \text{ degrees}$$

we get:

$$S = \frac{32M}{\pi d^3} = \frac{32PR_p}{\pi d^3}$$

(for round wire)

For rectangular wire of width a and depth b,

$$c = \frac{b}{2} \text{ and } I = \frac{ab^3}{12}$$

so that the stress equation then becomes:

$$S = \frac{6M}{ab^2} = \frac{6PR_p}{ab^2}$$

(for rectangular section).

★ ★ ★

For torsion springs having a small index, say less than 3.5, a curvature correction factor K_3 for round wire and K_4 for rectangular wire must be used. These factors are similar to the Wahl correction factor previously discussed for extension and compression springs.

STRESS CORRECTION COEFFICIENT FOR TORSION SPRINGS

C	K_3	K_4
3.0	1.53	1.29
3.5	1.27	1.24
4.0	1.25	1.20
4.5	1.20	1.17
5.0	1.18	1.15
5.5	1.16	1.14
6.0	1.14	1.12
6.5	1.13	1.11
7.0	1.12	1.10
7.5	1.11	1.10
8.0	1.10	1.09

WHERE C = MEAN DIAMETER OF COILS / WIRE DIAMETER

$K_3 = \frac{4C^2-C-1}{4C(C-1)}$ FOR ROUND WIRE

$K = \frac{3C^2-C-.8}{3C(C-1)}$ FOR RECTANGULAR WIRE

The general formulas for stress are therefore modified to read:

$$S = \frac{32M}{\pi d^3} K_3 \text{ (for round wire) where } K_3 = \frac{4C^2-C-1}{4C(C-1)}$$

$$S = \frac{6M}{ab^2} K_4 \text{ (for rectangular section) where } K_4 = \frac{3C^2-C-.8}{3C(C-1)}$$

The chart on our screen shows that the values of K_3 and K_4 rise rapidly as the value of the spring index C decreases. For example, for an index of 6, $K_3 = 1.14$ whereas for an index of 3, $K_3 = 1.33$. In other words the curvature correction factor shows that the actual stress is 14% higher for a spring with an index of 6 as calculated with the usual stress formula while for an index of 3 the actual stress is 33% higher. It might be pointed out that torsion springs should be loaded in the direction that will tend to wind up the spring. This is important since in coiling spring originally, the cold working in doing so permits higher working stresses in the direction of original coiling. This condition is especially welcomed when the spring index is small or when the curvature factor K_3 or K_4 is large. Torsion springs can actually be wound under load until the inside diameter of the coils approaches the diameter of the arbor originally used in coiling the spring, before permanent set takes place.

★ ★ ★

Usually torsion springs are used in very close quarters, and practically all available space is used when the spring is fully wound. You will note that the length of a torsion spring that is coiled close wound is equal to the number of active coils plus one, times the wire diameter. As this torsion spring is wound, an additional wire diameter has to be added for each successive turn of the spring, and allowance must be made for this additional space to prevent binding.

★ ★ ★

Also note that a torsion spring changes in diameter when being wound up. Since the wire length remains constant, and the number of turns increases, the diameter of the spring naturally has to become smaller. In designing a torsion spring, sufficient clearance must

(*Please turn to page* 340)

A New Process for Wire Drawing, Packaging, Handling and Dispensing

The new wire container described here has met with a favorable reception in the small segment of our industry that so far has had an opportunity to try it. This article tells briefly how it was developed, who participated in it, how it works and what it is expected to accomplish.

A new wire container, the "Payoffpak," that has been called "THE LONG PLAYING RECORD OF THE WIRE INDUSTRY," offers a revolutionary and completely different answer to some of the problems of drawing, packing, storing, shipping and dispensing wire. **Continental Can Company** has introduced this fibre drum as an integral part of a new patent-applied-for wire handling process developed by The Driscoll Wire Company of Shelton, Conn. The process makes possible important short-cuts and economies for wire manufacturers and fabricators.

★ ★ ★

Although the wire industry has enjoyed many refinements in manufacturing techniques, there have been relatively few revolutionary changes in the last two decades. The new Payoffpak, however, promises to introduce some truly significant changes.

★ ★ ★

The system or principle involving its use has already been compared, from a standpoint of importance, with the introduction of the carbide die. The payoff system incorporates certain wire handling principles that have been overlooked through the years merely because they were believed to be impractical, impossible—or even ridiculous—and, therefore, were never sufficiently investigated to bring them to a point of practicable utility.

★ ★ ★

One of the first questions that is asked about the Payoffpak is, to what does the end of the wire fasten? The answer? It doesn't. The end of the wire is loose in the bottom of the container.

★ ★ ★

Actually, this system begins where most present-day equipment and processing ends. At present wire is drawn through one or a series of dies and is accumulated on a block. Here, generally speaking, is where the manufacturing process ends. In the payoff system, after the wire passes through one or several dies, the terminal end is looped five or six times around a block or capstan. The tension or snub is maintained with the aid of a spring-loaded, rubber-coated pressure wheel. From the block, the wire is then run off through a pipe or guide eyelet into the Payoffpak, which is rotating at the same speed as the capstan. Of course, as in present day processing, the wire passes through a casting device which places in it approximately a 16-inch cast, conforming exactly with the imaginary wire line or mean diameter of the Payoffpak.

★ ★ ★

In using the Payoffpak, there are diverse opinions as to whether it is better to purchase a complete new wire drawing and packaging machine or to adapt machines now in operation. Contrary to what one might think, this system is neither complicated nor costly. In any event, the decision of whether to convert existing equipment or to purchase new equipment is a question which must be decided between the wire producer and the wire machinery manufacturer. Continental is concerned primarily with the Payoffpak, and it is turning over to reliable machinery manufacturers all of the know-how thus far accumulated in the building of machinery to perform this function. Operating details and technical aid will be supplied by Continental to these manufacturers, who in turn will combine these principles with their own in-

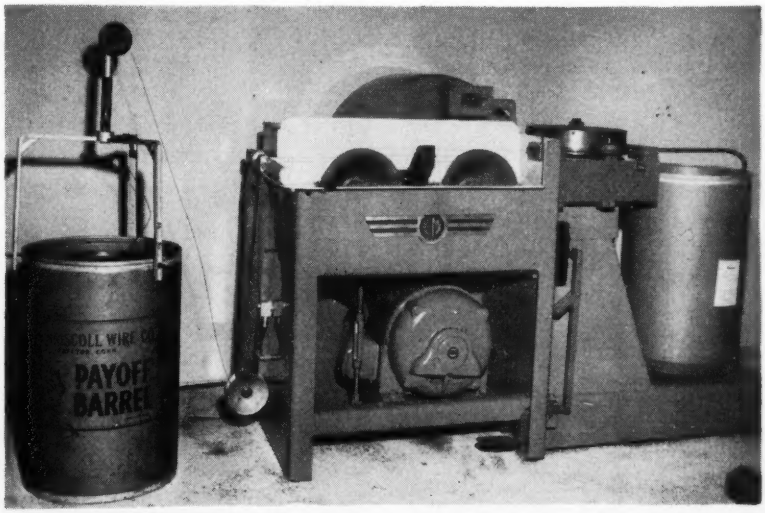


Fig. 1—The Payoffpak in action at the Driscoll Wire Company. Wire is being paid off at the left into the wire drawing machine and being coiled into the Payoffpak at the right. * *

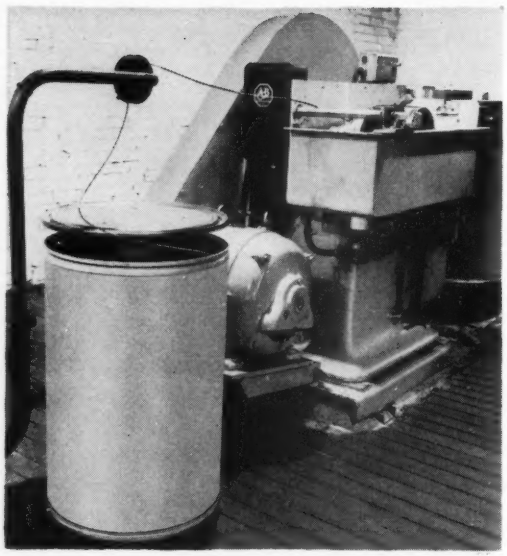


Fig. 2—Closeup of wire being paid off from Payoffpak into one of the first experimental wire drawing machines. * * *

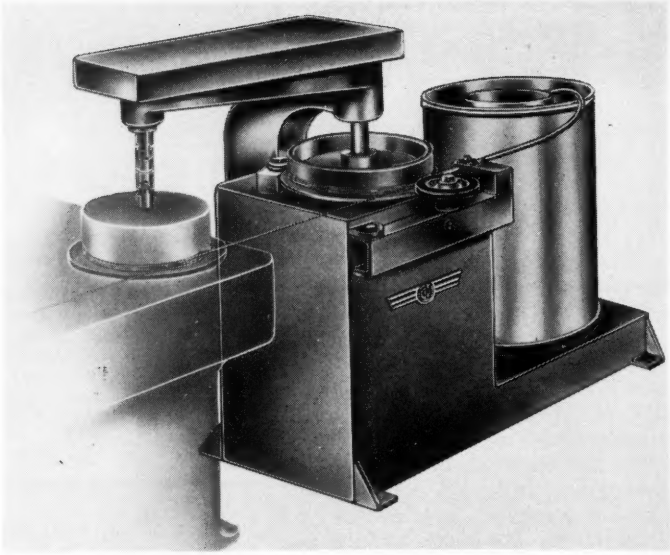


Fig. 3—Drawing of Coulter and McKenzie's attachment which makes it possible to convert a large variety of wire drawing machines to the Payoffpak method. * *

dividual engineering refinements to produce their machines.

★ ★ ★

The Coulter and McKenzie Machine Company, Bridgeport, Conn., were the first to build a complete wire drawing and packaging machine to load Payoffpaks. The original machine is shown in the illustrations. This company has also developed a conversion attachment that can be used to adapt a high percentage of the wire drawing machines now in use to the new system.

★ ★ ★

It is frequently asked what kinds of wire can be handled successfully with the payoff system. Naturally, to date, claims are limited by relatively short experience. However, it is believed that, through engineering refinements a very high percentage of sizes and types of wire now manufactured will lend themselves to this principle. Actual experience, so far, has been limited to low carbon steel and brass wires of .017 to .062. Wire falling into these categories can utilize the system immediately. Interest has been high for using this system on other sizes and alloys of wire. No claims outside the scope of experience are so far made, but it is felt that the possibilities for handling other types look exceptionally good.

Insofar as speeds are concerned, once again, it is possible only to recommend only the speed brackets in which experience has been gained. In the case of low carbon steel wire, speeds from 400 to 1,000 feet a minute are commonplace, although speeds approaching 2,000 feet per minute have been accomplished. At the present stage of development, generally speaking, the slower a drum revolves, the heavier the total weights that can be packed. Due to centrifugal force, lighter loads are secured at higher speeds.

★ ★ ★

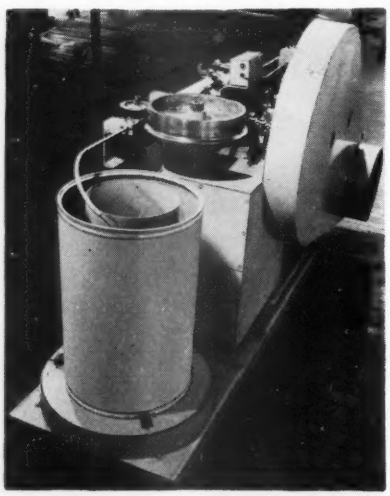


Fig. 4—Closeup of wire being fed into Payoffpak from drawing machine. Note turn table on which Payoffpak rests, which is synchronized with the speed of the capstan.

In talks with various personnel within the wire industry, the manufacturer of the Payoffpak has attempted to determine where the greatest benefits from the system may lie—with the wire manufacturer or fabricator. Actually, it is equally beneficial to both. A recent conversation between a sales manager and a chief engineer throws an interesting light on this angle. The sales manager remarked, "I can see where this system has tremendous advantages from a production standpoint." The chief engineer answered, "while this will be a tremendous boost to production, the real key is its sales advantage."

★ ★ ★

Let us look at a few statistics to decide whether the sales manager or the chief engineer was most nearly right. Up to this point it is not easy to cite actual economies in dollars and cents, as conditions vary widely because of the infinite varieties of wire, spools, coil sizes, weights and other conditions. However, some outstanding examples have come to light. In carrying out an order specifying coils weighing 25 pounds each, with a small weight tolerance permitted, the number of operations to produce 400 pounds of these coils (stripping, tying, loading on a skid, untying, splitting and weighing, retying, wrapping, and placing in a

In this Continental fibre drum is a secret that can change the habits of the entire wire industry

The "Payoffpak" promises new economies to anyone who draws, packs, ships or works industrial wire.

From Continental Can Company, originator of Tailor-Made packages, now comes a revolutionary new method for drawing, packing, transporting and processing wire. "Payoffpak" fibre drum is part of a continuous wire-drawing and packaging device that eliminates more than half the steps in the handling of wire. "Payoffpak" eliminates all tying, paper wrapping and extra shipping containers. It cuts down on terminal waste of wire, and feeds wiring into machines with constant tension and no overrun. You use wire from a "Payoffpak" with the same ease as the grocer pulling string off a large ball. Will you let Continental's packaging engineers show you how the "Payoffpak" can pay off for you?

CONTINENTAL CAN COMPANY

FIBRE DRUM DIVISION • VAN WERT, OHIO

New York • Philadelphia • Pittsburgh, Pa. • Tonawanda • Cleveland • Chicago
Atlanta • St. Louis • San Francisco • Los Angeles • Eau Claire • Pittsburg, Calif.

box or barrel for shipment) add up to a surprising total in number of handlings, all of which are eliminated by the payoff system. Another producer is paying from $7 to $8 freight for the return of empty spools on which 500 pounds of wire had been shipped. This bookkeeping, return freight, original packaging, investment in a spool inventory and other factors are also eliminated in the payoff system. In another case a manu-

Fig. 5—Closeup view of loaded Payoffpak. Spinner ring (at top) is shown in place covering drum core. Drum cover is at right and lever locking band for sealing is at left.

facturer was feeding an eight strand tinning frame from dead reels with coil sizes approximating 100 pounds. By replacing the dead reels with Payoffpaks, each containing a 500 to 600 pound reservoir of wire, he found that production on this eight strand unit was increased by 50% without increasing man-power. Furthermore, as soon as possible, he plans to install eight Payoffpak loading attachments on the eight block finish end, and has every reason to believe that tonnage production will again be increased appreciably.

★ ★ ★

In listing the advantages to be realized by the Payoffpak, these points are primary:

(1) Because the wire is automatically packaged as it is drawn, the costs of stripping, tying, handling, splitting, etc., are eliminated.

(2) Since the wire is accumulated in the Payoffpak to capacities ranging up to 600 pounds, the down time on wire drawing machines necessary for the stripping operation is materially reduced.

(3) Costs are further reduced when, in many cases, it is possible to feed a wire drawing machine from one Payoffpak, load into another on the finish end of the machine, and have the wire packaged and ready for immediate shipment.

(4) The necessity for a range of block sizes is eliminated because wire fabricators or converters, who formerly required a variety of coil diameters, can discard all reels for a single standard size Payoffpak. Clockwise and counter clockwise winding is eliminated, as well as the expense of stand-by equipment.

(5) Wire that is automatically laid into a Payoffpak is untouched by the operator. This reduces considerably, in the case of steel wire, complaints on rust, corrosion and contamination, particularly during the summer months.

(6) The inexpensive Payoffpak container reduces shipping costs materially because of extremely light tare weight, as compared with other conventional bulk shipping containers.

(7) In-plant handling of Payoffpaks loaded with 500 to 600 pounds of wire is easily accomplished by any one of a number of conventional hand trucks. Furthermore, maximum utilization of storage space is possible through palletizing and fork lift truck handling, made possible by the high stacking strength of the core construction.

Here is a typical example to illustrate the comparative labor steps involved in the conversion of 500 pounds of steel wire:

WITH PAYOFFPAK

(1) Locate Payoffpak at machine.
(2) Adjust cover.
(3) Pick up terminal end of wire.
(4) Feed into machine.
(5) Repeat steps 1 and 4 only every 400 to 500 pounds.

TOTAL OPERATION PER 500 POUNDS—5

WITH COILS IN REGULAR DRUMS OR BARRELS

(1) Locate barrels in storage area near machine.
(2) Remove cover.
(3) Lift single coil from barrel.
(4) Place on reel.
(5) Untie coil.
(6) Locate and bring out terminal end.
(7) Feed into machine.
(8) If 8″ coils, repeat step 2 through 7 every 25 to 35 pounds. If 16″ coils, repeat 2 through 7 every 75 to 100 pounds.
(9) Repeat steps 1 through 7 approximately every 500 pounds.

TOTAL OPERATIONS PER 500 LBS. 8″ COILS—59

TOTAL OPERATIONS PER 100 LBS. 16″ COILS—31

Other advantages to the wire fabricator are:

(1) If space demands, Payoffpaks may be located some distance from the machine, (on a balcony or a lower floor) and the wire piped or guided to the machine. This has proven practical with fine wire, since the continuous length mileage contained in the Payoffpak will supply a machine for days, or in cases of lower consumption, up to a week or more.

(2) Since there is no inertia or overrun problem, machine speeds can be appreciably increased.

(3) Operators are free to handle additional equipment or check product quality when released from the duties of replenishing wire supply and threading machines.

(4) Inventories can be held to a minimum, since different spool sizes and clockwise and counter clockwise windings for individual machines are no longer necessary.

★ ★ ★

One operator has stated that by replacing conventional coils with the Payoffpak, in his piece work, production has been equal to adding two phantom machines to each battery of eight.

★ ★ ★

The various statistics and experiences related above, illustrating the savings, advantages and convenience of the Payoffpak system, point up the equal advantages to be had in both production and sales.

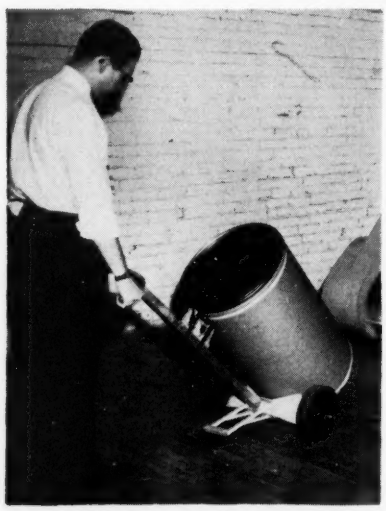


Fig. 6—In a Payoffpak, loads of up to 600 lbs. of wire are handled quickly, easily and safely with a conventional hand truck.

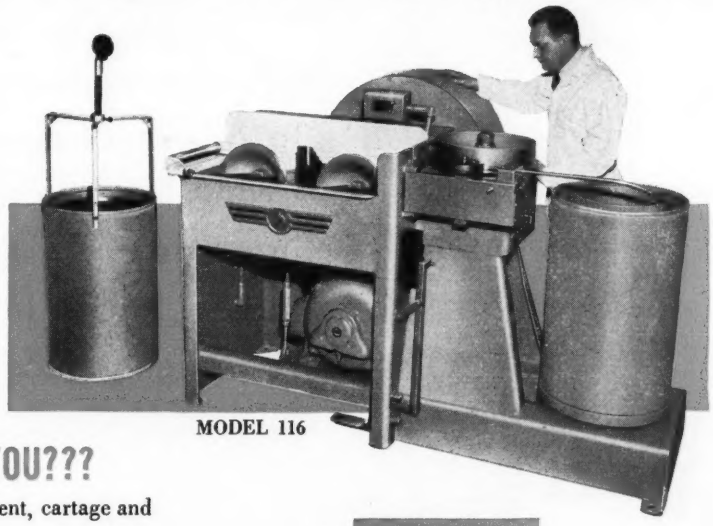
The Payoffpak system was developed by **The Driscoll Wire Company** as a sales tool. As operators of a non-integrated wire mill during periods of raw material shortage, the executives of The Driscoll Wire Company realized that an in-

(*Continued on page* 285)

*With the new COULTER & McKENZIE Continuous Wire Drawing and Packaging Machine

COMPLETELY EQUIPPED— IMMEDIATELY AVAILABLE

Model 116 is designed primarily for the specialty fine wire trade to draw and package wire *continuously* into an inexpensive PAYOFFPAK fibre drum. With this machine you can cash in *immediately* on the tremendous savings made through this revolutionary new principle.



MODEL 116

WHAT DOES THIS MEAN TO YOU???

Big Costs Eliminated

Cost of reel and spool investment, cartage and maintenance expenses.

Cost of tying, bundling, and packaging.

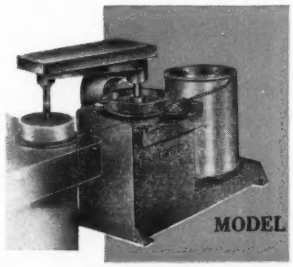
Cost of corrosion loss and scrap due to inefficient handling.

Big Savings Realized

Savings in greater weight more easily handled.

Savings in trouble free runs.

Savings through neater storage in larger packages.



MODEL 126

Model 116 is supplied ready for production; it requires only a wire-lead to the motor and stringing-up. The unit is furnished to meet your particular speed, horsepower, and die requirements.

CONTINUOUS WIRE PACKAGING ATTACHMENT

This unit can be custom fitted to your existing equipment. Write for our engineering questionnaire.

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Our long experience as manufacturers of wire is at your complete service.

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EXCLUSIVE FEATURES available only in U.S. MOTORS

1 *Asbestos-protected windings*

All U. S. motors embody the most enduring of windings — asbestos-protected to withstand high temperatures and to guard against carbonization. Reinforced with Mylar. Motor windings undergo 9 treatments of dipping, spraying and baking to insure complete insulation and moisture resistance.

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Lubriflush provides transverse lubrication through the bearings, insuring complete purge of old grease and replacement with new lubricant without disturbing bearings or disassembling motor.

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All castings are heat-seasoned by normalizing to insure against distortion. Perfect permanent alignment is maintained which means longer bearing life, precise air gap between rotor and stator and proper fit of parts.

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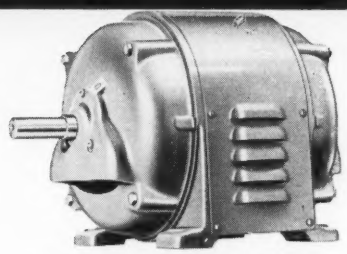

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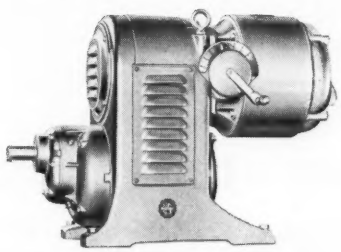
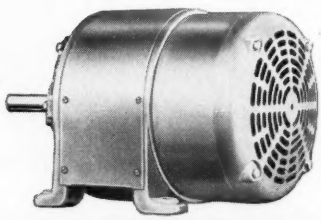
Strikingly attractive in appearance. Smooth, streamlined contours. Drip-proof. Ratings from ¼ to 250 hp.



U. S. VARIDRIVE MOTOR
Infinite speeds. You get any rpm by merely turning a dial. 2 to 10,000 rpm in ratios up to 10:1. ¼ to 50 hp.



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Explosion-Proof and Non-Explosion-Proof types. With or without Underwriters' label. For dangerous, dusty or damp locations.

U. S. MOTORS
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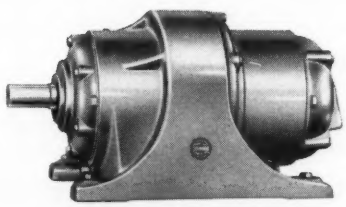
PAY-OFF BARREL WIRE DRAWING MACHINES



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Internally-geared power. Pyramidal structure for greatest stability. Helical gearing fully enclosed. Most compact. ¼ to 30 hp. 5 to 10,000 rpm.

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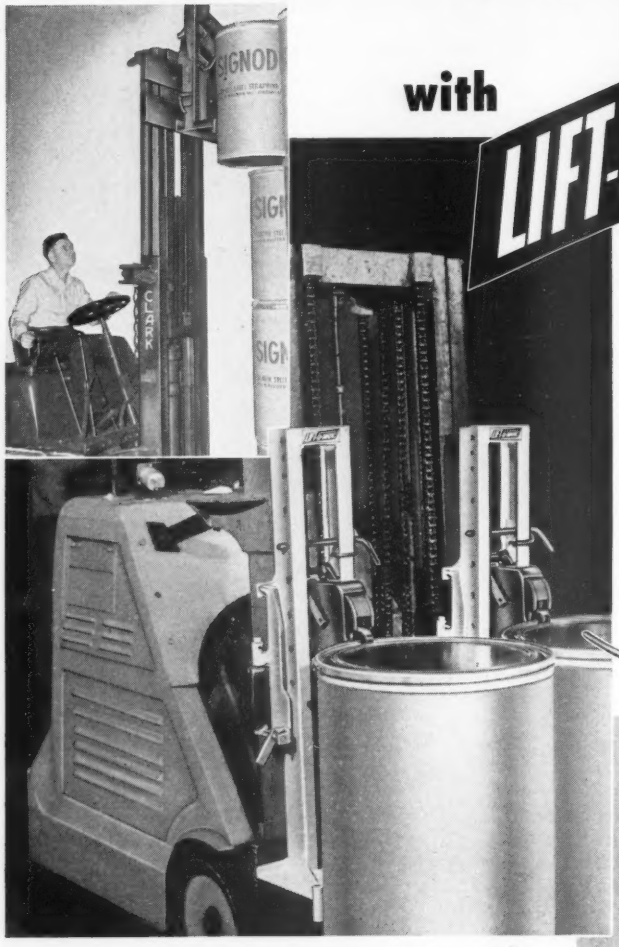
- EASILY
- ECONOMICALLY



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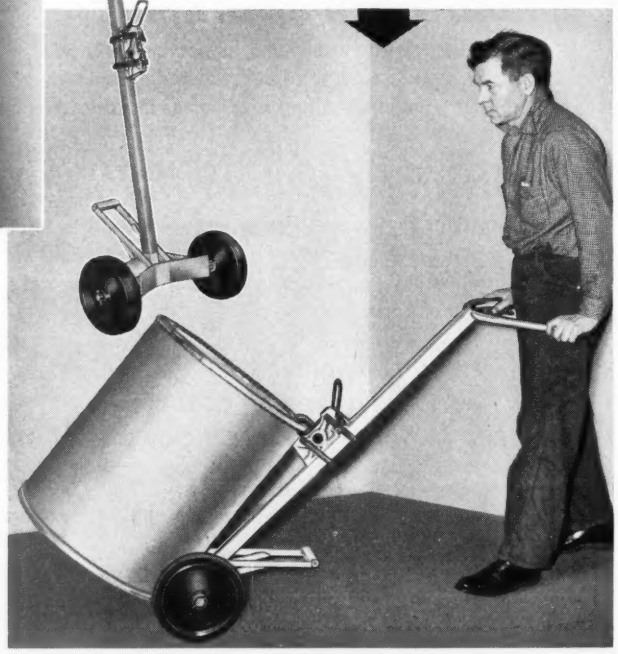

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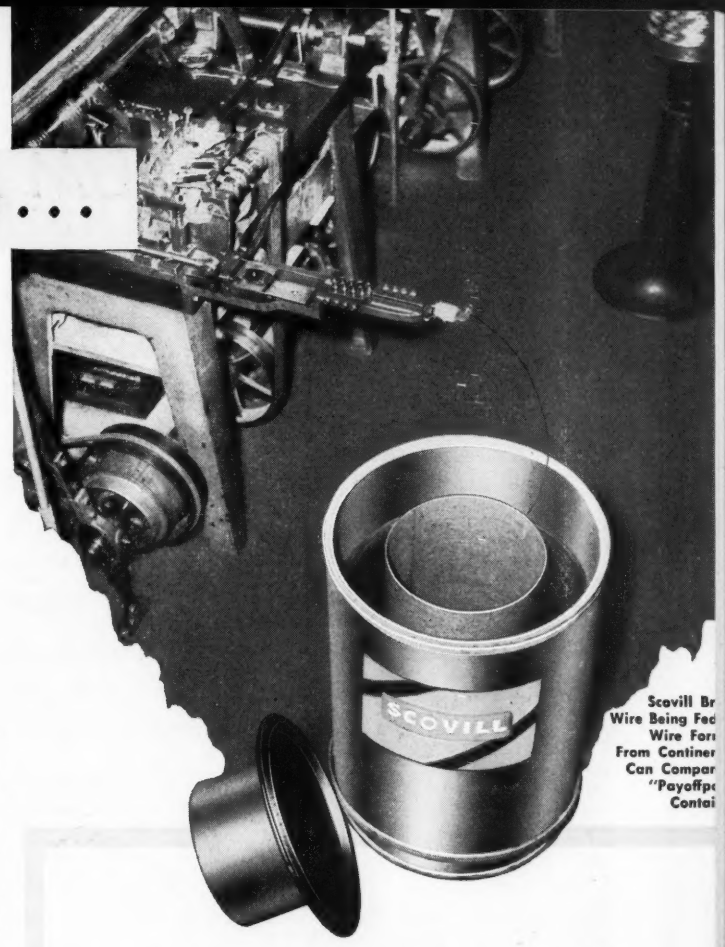

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.016"	411,000 feet	.036"	80,000 feet
.018"	324,000 "	.040"	63,000 "
.020"	257,000 "	.045"	50,000 "
.025"	162,000 "	.051"	40,000 "
.032"	101,000 "	.057"	31,000 "

CONTAINER DIMENSIONS:
Outside height ..... 30¾"
Outside diameter ..... 20¾"

PERTINENT WIRE ALLOYS:
Any copper-base alloy

APPLICABLE WIRE DIAMETERS:
.016" - .060", inclusive

TEMPERS OF WIRE:
Any temper except soft

ILLUSTRATED ABOVE is "inner-lid-off" view of new and ultra-modern wire container, used first in the Brass Industry by Scovill to package its wire. For suggestions as to your best method of feeding copper-base alloy wire from this container to your wire forming machines, ask for Scovill Technical Service when you order wire from your nearest Scovill office listed below.

When using Scovill wire from Continental Can Company's "Payoffpak" container, you simply wheel it on a hand truck to *your* wire forming machine . . . start up and run steady for days on end!

Imagine the savings involved to you . . . in storage and material handling alone, not to mention the great reduction in loss of time or material as is the case when small coils are changed frequently.

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WIRE DRAWING CARRIERS

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Guides, Sheaves, Capstans, Nipples, Shafts, Cams, Steam & Water Seals, Tubing Head Parts & Worms, Wire Straighteners, Textile Fingers and other parts.

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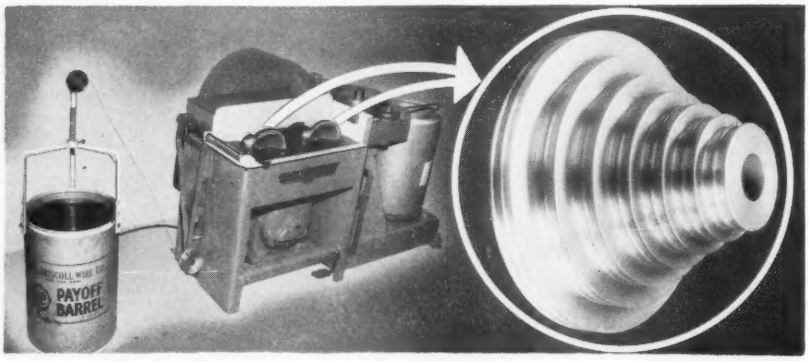

Detail of surface of carriers that we have chromium plated on the Coulter and McKenzie Machine Co.'s No. 116 Continuous Wire Drawing Machine.

The Driscoll Wire Company, of Shelton, Conn., used to replace its wire drawing carriers after 6 months of service. Some 6 years ago, we placed a chromium plate of .015" thickness on their carriers, which are still operating satisfactorily. This is a LIFE INCREASE OF 12 TIMES, so far.

You, too, can enjoy the advantages and economies resulting from a chromium plate that is "file-hard," non-magnetic, and that provides extraordinary wear-resistance. Our engineers, with 8 years of experience in a large wire products manufacturing company, will be glad to consult with you on your chromium plating problems, without obligation.

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A booklet describing the functions of the Association and a membership application card will be sent you upon request.

THE WIRE ASSOCIATION

RICHARD E. BROWN, ***Executive Secretary***

453 MAIN STREET **STAMFORD, CONN.**

The Use of Industrial Hard Chromium on Wire Machinery Wear Parts

by Warren Schmidt, President
City Plating Works, Inc.
Bridgeport, Conn.

Hardsurfacing of wear parts of wire processing machines is one of the live topics of the day. The author's company applies a hard chromium plate to achieve wear resistance. This process was used on the equipment developed by the Driscoll Wire Company, in cooperation with Coulter and McKenzie Machine Company, in the Payoffpak method of packaging wire, as a result of the outstanding success that the wire company experienced in the preceding years from their having had the wear surfaces of their equipment chrome-plated.

The abrading effect of wire on carriers, drawing blocks, sheaves, pulleys, capstans and all other rapid-wearing parts of machines used in the manufacture of wire and wire products has long been the bane of the manufacturer, the worry of the maintenance man and, currently, an important limiting factor in the reduction of costs.

★ ★ ★

Some progressive wire product manufacturers have made use of chromium plate on these types of parts with outstanding results.

★ ★ ★

An instance in which the writer was concerned was the application of a chromium plate of .015" thickness on the cast iron wire carriers of **The Driscoll Wire Company** of Shelton, Conn. An engineer with that company reports that before the application of the chromium plate, a carrier would wear so much in 6 months that it would have to be replaced or have a sleeve shrunk on, and might then last for another 6 months. Following the application of the chromium plate the carriers have been operating for 6 years and are still in good condition. The carriers operate submerged in a wire drawing solution. Similar work for other wire product companies in Connecticut has resulted in equally satisfactory experience.

★ ★ ★

The textile industry has adopted chromium plate in many applications, which has cut costs in maintenance and reduced machine down-time enormously.

★ ★ ★

With the gradual appreciation of the remarkable physical properties of chromium, others in the wire industry should be able to cut their costs and eliminate many production headaches.

★ ★ ★

A striking example is offered in a new principle of continuous wire drawing and packaging developed by The Driscoll Wire Company. Machines incorporating this principle are now being manufactured by the **Coulter & McKenzie Machine Company** of Bridgeport, Conn., for use with the **Continental Can Company's** Payoffpak.

★ ★ ★

The 8-die machine with its cone-shaped carriers has a variable adjustment electric clutch which provides smooth, shock-free starting and sensitive control while thread-up; a 360° turn-table locking device centers and locks the Payoff-pak type drum into position; and 2 expendable double-track carriers, which are plated with .010" of hard chromium, assure long, trouble-free life, economical replacement and rapid changeover.

★ ★ ★

The speed of operation is 1000 feet per minute and the machine is powered by a 15 h.p., 900 R.P.M., No. 365, Nema Frame motor.

★ ★ ★

It occupies a floor space of 7′ x 3′-6″. The height of the barrel from the floor is 10″ and the overall height is 4′-6″. The machine's net weight is 2,850 lbs.

The .010" thickness of the plate upon the cast-iron carriers is called a hard chromium plate. Any thickness above .0001" is generally called hard chromium, while a lesser thickness is called a flash or decorative plate.

★ ★ ★

Industrial hard chromium plate is an ideal covering for any metal part which is subjected to abrasion, corrosion or wear. It is the hardest of all plating metals, having the hardness of the sapphire and a reading of 9 on the Mohs scale, which is based upon the hardness of the diamond with a reading of 10. Its smooth slippery surface does not readily stick to any other medium, it is non-magnetic, does not gall, has an oxidizing point of 1830°F, resists attack by most acids, alkalies, salts and other corrosive materials and may be quickly renewed and replated when wear does occur. This reduces maintenance and replacement costs to a minimum.

★ ★ ★

On the working parts of machinery used in the wire products industry, its hardness and resistance to wear preserves the accuracy of the machine over long periods.

★ ★ ★

Our company has been depositing a .007" thick hard chromium plate upon the steel quills of the various sizes of milling machines manufactured since 1936 by Bridgeport Machines, Inc. This internationally-known company has never had a machine returned because of wear or failure of the plate on the quills on the approximately 20,000 machines they have produced. This feature accounted for the accuracy and popularity of these machines.

For years, the author's company has been chromium plating over 80 aluminum, brass, cast iron and steel parts on the famous jig borer of the Moore Special Tool Company of Bridgeport, the accuracy of which is universally recognized.

★ ★ ★

Precision plating is made possible by the use of conforming anodes, special plating solutions, accurate timing of the plating operation and other plating devices, so that, usually, no further operations are required upon the chromium-plated parts.

★ ★ ★

Since chromium is non-magnetic and corrosion resistant with a friction free surface, it does not pick up chips or other foreign particles when used on guides or machine fingers.

★ ★ ★

Manufacturers of wire are well aware of the wear that takes place on such parts as guides, sheaves, nipples and dies, shafts, cams, steam and water seals, tubing head parts and worms, wire straighteners, loom fingers and many other parts, all of which may be chromium-plated to provide many times the life of unplated parts and to reduce friction in the movement of the wire through the machines.

★ ★ ★

During and since World War II, the use of hard chromium plating expanded by leaps and bounds. Builders of molds, dies, machine tools, industrial machines and equipment of all types are rapidly finding new applications for this wear-resistant metal. Wire products manufacturers are also gradually coming to appreciate its value in the matter of cutting production costs.

★ ★ ★

Although it normally takes one hour to deposit one thousandth (.001) of an inch of chromium plate, the cost of plating is a comparatively economical operation as compared to replacement of worn parts, or salvaging by means of welding or metal spraying. Machine down time is thus reduced to a minimum by a coating of chromium which can be accurately deposited on any desired area.

★ ★ ★

On the carriers of the new Coulter & McKenzie machine, a flash copper plate is first applied before the .010" of chromium is deposited. This copper flash serves two purposes. First, it reduces the current that must be applied to cast-iron at the start of the chromium-plating operation. This current is 6 times the regular plating current used on steel. Second, the copper flash also provides visual evidence of the depletion of the chromium plate if and when the latter is finally worn through, as the copper under-coat shows a reddish color.

★ ★ ★

When the chromium plate does wear through, it can be easily stripped from the carrier and another plate applied to give the part a second lease of life equivalent to the original. In some instances, chromium may be plated over chromium.

A New Process for Wire Drawing, Packaging, Handling and Dispensing

(*Continued from page* 276)

crease in the specialty and fine wire end of their business was necessary to maintain satisfactory dollar volume. To do this, they decided that something more than increased sales pressure along conventional lines was required and they directed their thinking along the line of packaging and handling improvements.

★ ★ ★

Having purchased various dry chemicals shipped to them in other fibre (Leverpak) drums, The Driscoll executives decided that the strength and uniformity of construction in these drums could become an actual working part of the wire drawing and packaging process they were visualizing. Actually, the characteristics of the fibre drum were eventually used as a starting point for designing the process. This drum proved to be satisfactory in every respect by standing up under high revolving speeds and heavy loads—and acting as ideal protection for the wire during shipment.

When the first loading machine was completed, and after months of experimentation, sample Payoffpaks of wire were sent to users for testing. Almost without exception, these tests were followed by requests for "more as soon as possible." Payoffpaks were then introduced to other fabricators producing a wide variety of wire forms. Before long, although only a small fraction of the wire field had been exposed to this principle, Driscoll and Continental began to feel that the Payoffpak had much wider possibilities than originally thought.

★ ★ ★

The Driscoll Wire Company applied for patents in the early stages of the project. Since then, by arrangement with Driscoll, all manufacturing and patent rights have been transferred to Continental Can, which is actively engaged in the introduction and promotion of this new system to the wire industry.

★ ★ ★

In the copper-base alloy wire field, **Scovill Manufacturing Company,** Waterbury, Conn., is the first brass concern to offer its wire to the trade in the Payoffpak.

★ ★ ★

The Payoffpak was given its first public showing at the Packaging and Materials Handling Show in Boston last year, where **W. H. Richardson** of The Driscoll Wire Company won first prize in the materials handling group of the competition.

★ ★ ★

Besides the broad utility and economy offered by the Payoffpak system, the most important consideration is its extreme simplicity. No special equipment is required to remove the wire and loading is accomplished by simple, easily operated, inexpensive machines or conversion units.

★ ★ ★

From the reception accorded the Payoffpak by those who have used it—either wire producers or wire product fabricators—it seems evident that this new processing accessory will result in a revolution in wire processing and handling.

WHETHER YOU WALK, RIDE OR FLY...

BE SURE TO ATTEND THE

WORCESTER REGIONAL MEETING

April 22 and 23, 1954, Sheraton Hotel, Worcester, Mass.

The Program

Thursday, April 22nd

9:00 A.M.—Registration Desk Opens on Mezzanine Floor
10:30 A.M.—Directors' Meeting; 12:00 M.—Directors' Luncheon
2:00 to 5:00 P.M.—Technical Sessions

FERROUS SECTION—In Baroque Room

CHAIRMAN OF MEETING: Wade Hauk, General Superintendent, American Steel and Wire Div., U. S. Steel Corp., Worcester, Mass.

PAPER: "Manufacturer's Wire" by Rodman R. Tatnall, Field Service Metallurgist, Wickwire Spencer Div., Colorado Fuel & Iron Corp., Buffalo, N. Y.

PAPER: "Observations on the Effects of Pre-Plating Hot Galvanized Steel Wire" by Allan T. Baldwin, Chem. Eng., Hansen-Van Winkle-Munning Co.; Co-author: Henry H. Passolt, Chief Met., Johnson Steel & Wire Co., Worcester, Mass.

PAPER: "Practice and Control for the Manufacture of High Carbon Commodity Wires" by Robert H. Isenberg, Met. Eng., Pittsburgh Steel Co., Monessen, Pa.

NON-FERROUS SECTION—In Crystal Room

CHAIRMAN OF MEETING: Shaw Goldthwait, Quality Control Eng., Collyer Insulated Wire Co., Pawtucket, R. I.

PAPER: "Hypalon Chlorosulfonated Polyethylene, a New Material for the Wire and Cable Industry," by F. W. Keeley, E. I. du Pont de Nemours & Co., Wilmington, Del.

PAPER: "Opinion versus Facts in the Wire Industry," by A. U. Sternlof, Div. Product Eng., Quality Control, Electric Cable Div., American Steel & Wire Div., U. S. Steel Corp., Worcester, Mass.

PAPER: "Evaluation of Natural and Synthetic Rubbers for Insulated Cable" by Victor Siegfried, Chief Research Eng. of Electric Cable Div., American Steel & Wire Div., U. S. Steel Corp., Worcester, Mass.
Co-Author: W. G. Dahlstrom, Division Research Engineer, of the same company.

6:15-7:00 P.M.—Cocktail Hour, Open To All Who Register
7:00 P.M.—Banquet. After Dinner the Group Will be Addressed by a Speaker of Outstanding Reputation.

Friday, April 23rd

PLANT INSPECTION TOURS

8:30 A.M.—Busses leave for Ferrous Plant Inspection Tour of the Palmer Works of The Wickwire Spencer Steel Div., Colorado Fuel and Iron Corp. Luncheon at Palmer, Mass.

9:00 A.M.—Busses leave for Non-Ferrous Plant Inspection Tour of The Cable Works of American Steel & Wire Div., U. S. Steel Corp., in Worcester. Luncheon will be served in Quinsigamond, Mass.

THE FEE: One charge of $8.00 will cover registration, the technical sessions, the banquet and bus transportation to and from the plants to be visited.

FOR THE LADIES: A special trip on Friday morning to Old Sturbridge Village has been arranged, details and cost of which may be secured at the Registration Desk. Ladies are also invited to attend the banquet on Thursday evening.

THIS WILL BE A GREAT MEETING—TRY TO BE WITH US!

THE WIRE ASSOCIATION

453 Main Street **RICHARD E. BROWN, Executive Secretary** **Stamford, Conn.**

Cellular Polyethylene

by W. T. Higgins
Development Department
Bakelite Company
Division of Union Carbide & Carbon Corporation
New York, N. Y.

A paper presented at the Signal Corps Symposium at Asbury Park, New Jersey, on Dec. 15, 1953, and published here by permission of the author and his company.

Introduction

Since its development ten years ago, polyethylene has been found useful for many applications. The first and still one of the largest of these is electrical insulation. Its good mechanical properties, low moisture absorption, high resistivity and low loss characteristics make it ideally suited for this use. For certain applications requiring low loss behavior beyond that of solid polyethylene, a cellular form has been developed by the Bakelite Laboratories. By combining polyethylene having a dielectric constant of 2.3 with an inert gas having a dielectric constant of approximately 1.0, a composition of matter having a constant between these two values is possible. After three years of development effort by the laboratories of Union Carbide and Carbon Corporation, such a material has become commercially available.

★ ★ ★

The many field trials which have been held have been eminently satisfactory. Normal extrusion equipment has done an excellent job and only a few changes in technique are necessary to produce a good product.

Discussion

Bakelite cellular polyethylene is made by techniques which produce an intimate dispersion of a chemical blowing agent in polyethylene resin. The blowing agent is a thermally sensitive chemical which liberates gas at a specific temperature. The correct choice of the blowing agent for an electrical end use product is a critical one for it must meet several unusual requirements. For example, the blowing agent itself, the gas it liberates, and the residue product must not absorb moisture as water is detrimental to good electrical properties. It is desirable that the residue left after the blowing agent has expanded be non-polar to prevent the occurrence of losses at high frequencies. This is an ideal situation as it is not always possible to use a blowing agent which leaves a non-polar residue. Therefore, the blowing agent used should liberate large volumes of gas and leave as little residue as possible.

Extrusion

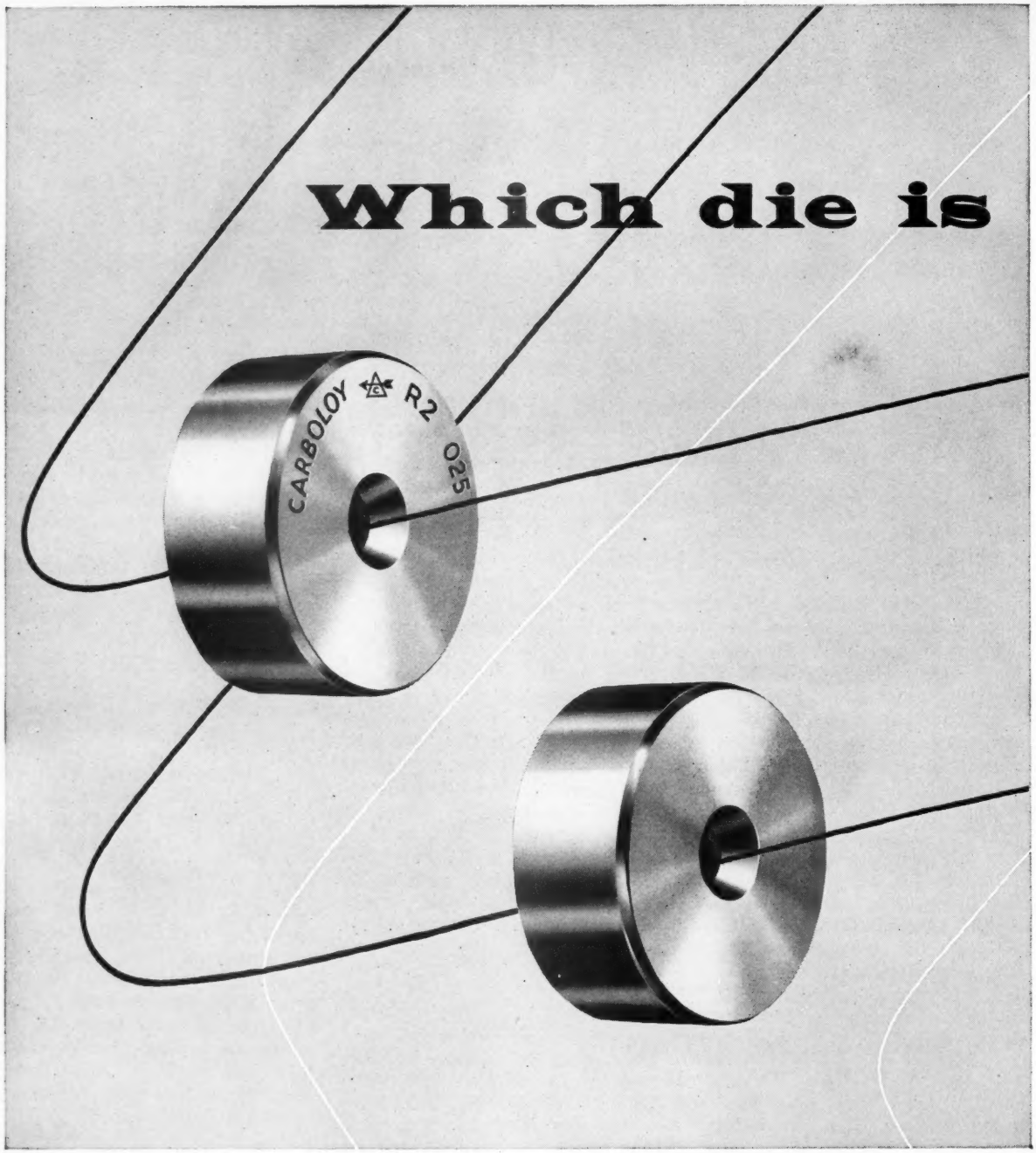
The blowing agent must be made to liberate its gas under controlled conditions. So far cellular polyethylene has been handled most satisfactorily in an extruder. Other methods of forming the material are under investigation but because the extruder maintains pressure constantly on the product it is most readily adaptable to providing the controlled conditions required during the liberation of the gas.

★ ★ ★

Aside from its normal operation the extruder in this case must perform two additional functions. The first is to cause the blowing agent, by application of heat, to liberate the gas. The second is to maintain sufficient pressure in the barrel, head, and die to prevent expansion of the liberated gas before it emerges from the die. When the machine is doing these functions properly the product has a smooth surface, a uniform bubble size, and a unicellular structure. Machines having a screw length to diameter ratio of 12 to 1 or better have been found more effective than extruders having lower ratios. The best machine conditions are those which give the lowest density at the lowest compound temperature. To determine the optimum conditions for a particular extruder it is recommended that the barrel and head temperatures be set at 300 and 250 F. respectively and the density of the product measured. The barrel and head temperatures should then be raised in 25 F. increments until a density of .47 is achieved. Operating temperatures higher than necessary give less uniform bubble size, a rougher surface and increase the cooling difficulties.

★ ★ ★

Several other factors, which are not normally encountered, must be considered in the extrusion of cellular polyethylene. To insure pressures in the barrel sufficiently high to prevent premature expansion of the gas a dense screen pack is needed. Screen packs of 20/60/-100/100 mesh screens have been effective. Head and die pressures are kept high by using a low head temperature and a die designed to restrict the flow of the material. That is, as the annular opening



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Trained engineers, backed by more than 25 years of carbide experience, plus modern Carboloy engineering facilities are at your service for special wire die problems.

7 Free Training School

Your die-room personnel will be instructed in the design, application and maintenance of carbide dies at the modern, completely equipped Carboloy Die Training School at Detroit.

8 Free Technical Literature

To help you order, use and service your carbide dies, a file of money-saving, timesaving information – the most complete in the industry – is available, free.

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between the wire or core and the die increases it is necessary to increase the die land length to prevent expansion. The exact length will vary with the machine and the optimum operating conditions. Premature expansion makes itself apparent by die plating or curling of the compound on the face of the die. This is accompanied by a rough surface.

★ ★ ★

When properly extruded the cellular polyethylene will expand 100% or double in volume. The area of the die opening with the wire in the die must be 50% of the area of the finished insulation. A convenient formula for computing the final diameter for a given die size or the die size from the final diameter for a circular cross section is

$$D = \sqrt{2D_1^2 - d^2}$$

where D = Final Diameter, D_1 = Die Diameter and d = Wire or Core Diameter.

★ ★ ★

The screw temperature should be maintained at approximately 212F. Lower temperatures result in uneven heating while higher temperatures cause the compound to stick to the screw and reduce output. High compression ratio screws have been slightly more effective than those having a low compression ratio.

★ ★ ★

To insure a smooth regular surface the wire should be preheated to 100 C. to 125 C. Lower temperatures give a lumpy product while higher temperatures result in erratic cooling and flattening of the insulation.

★ ★ ★

The cooling of the finished wire is often difficult. For thin wall insulations direct water cooling is possible. Where heavy walls are involved a long stretch of air cooling is desirable. If the product is quenched too rapidly it will flatten due to the weakness of the extruded coating at the extrusion temperature. Rapid contraction of the occluded gases before the polyethylene has developed any strength contributes to the deformation of the insulation. Both these tendencies are minimized by using the lowest possible compound temperature.

General Properties

Because cellular polyethylene is 50% gas, it can easily be predicted that certain properties of the polyethylene will be degraded while others will be improved. Table I illustrates the effect of the gas on some of the common properties of polyethylene.

★ ★ ★

It should be noted from the table that the tensile strength, elongation and dielectric strength of the cellular composition are degraded when compared with solid polyethylene but are still in a range which permits the use of this compound in many applications. The power factor values are essentially the same. The dielectric constant is very much lower and hence the cellular material exhibits lower losses than the solid polyethylene. The very low density is desirable where reduced cost and weight are important.

Fig. 1—"Bakelite" Cellular Polyethylene magnification 450 times.

structure of the expanded material. The dark areas shown are the cells. Because each gas cell is completely closed, the moisture permeability of this composition approaches that of solid polyethylene. Fig. 2 shows the percentage of moisture absorbed by solid and cellular polyethylene samples during immersion for 100 days in tap water at 23 C. Fig. 3 and 4 show the effect of this exposure on the power factor and dielectric constant of both materials respectively. This test is quite severe and the results indicate that this material will give good performance in alternately wet and dry environments often encountered.

Table I

General Properties

	Solid Polyethylene	Cellular Polyethylene
Wire Size #14 AWG Insulation OD	.250	.250
Tensile Strength, psi @ 23 C.	2180	670
Elongation, % @ 23 C.	580	310
Dielectric Strength, ASTM D-149-44		
Short Time @ .125"	630 v./mil	220 v./mil
Step by Step @ .125"	590 v./mil	190 v./mil
-55 C. Mandrel Bend, 2X	OK	OK
Specific Gravity	.92	.47
Power Factor @ 1,000 cycles	.00028	.00033
10,000 cycles	.00030	.00038
Dielectric Constant @ 1,000 cycles	2.3	1.48
10,000 cycles	2.3	1.49

Moisture Absorption

Bakelite cellular polyethylene has a unicellular structure. That is, each bubble or cell is completely enclosed in a shell of polyethylene. This enlarged photograph in Fig. 1 shows a picture of the actual

High Frequency Properties

An application which requires this moisture resistance is the recently developed cellular polyethylene antenna lead-in wire for ultra

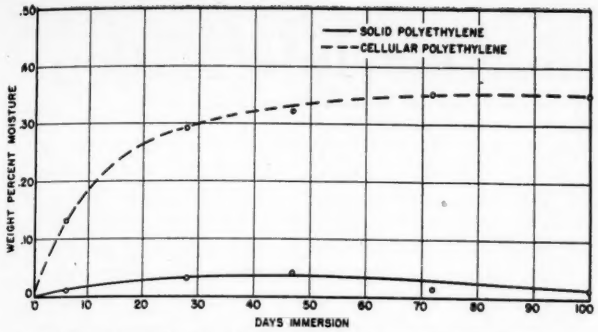

FIG. 2 WEIGHT PERCENT MOISTURE ABSORBED vs DAYS IMMERSION TAP WATER – 23 DEG. C.

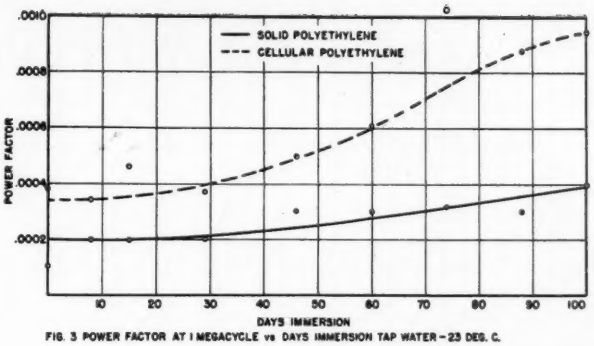

FIG. 3 POWER FACTOR AT 1 MEGACYCLE vs DAYS IMMERSION TAP WATER – 23 DEG. C.

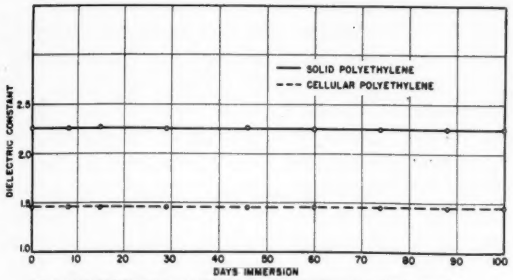

FIG. 4 DIELECTRIC CONSTANT AT 1 MEGACYCLE vs DAYS IMMERSION TAP WATER – 23 DEG. C.

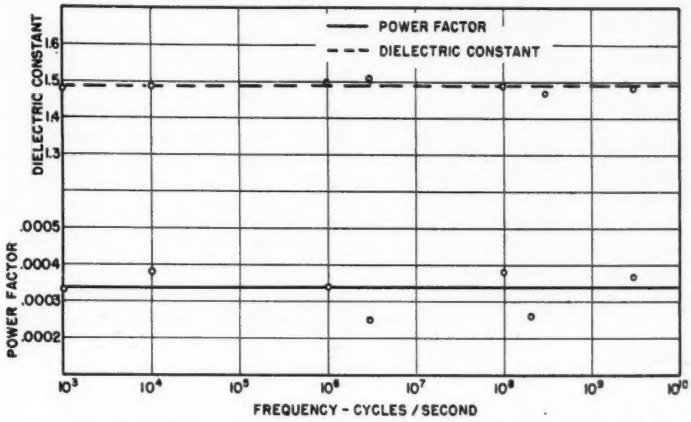

FIG. 5 POWER FACTOR AND DIELECTRIC CONSTANT OF CELLULAR POLYETHYLENE vs FREQUENCY

high frequency television reception. Another requirement for this and other high frequency applications is that the power factor and dielectric constant should be insensitive to changes in frequency. The presence of irregularities in either of these properties will result in power losses in the range of frequencies where the irregularities occur. In practice this might result in poor reception due to a weak signal in the case of the UHF antenna. The curves shown in Fig. 5 show the behavior of this material over the frequency range from 10,000 cycles to 3,000 megacycles. It can be seen that both the power factor and dielectric constant show little, if any, response to changes in frequency. This is a desirable situation as the absence of irregularities in either value means the power losses will be uniformly low.

★ ★ ★

In many installations contemplated for cellular polyethylene seasonal temperature changes will be concountered. To minimize power losses it is desirable that there be little change in the power factor or dielectric constant due to temperature changes. The curve given in Fig. 6 indicates that the requirement is very nearly met. The dielectric constant and the power

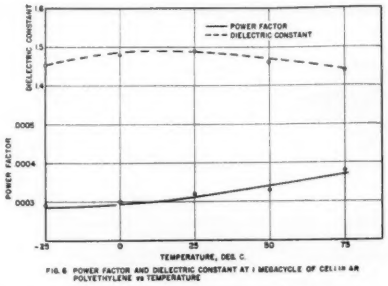

FIG. 6 POWER FACTOR AND DIELECTRIC CONSTANT AT 1 MEGACYCLE OF CELLULAR POLYETHYLENE vs TEMPERATURE

factor remain at essentially the same level over the whole temperature range.

★ ★ ★

The specific gravity of the cellular polyethylene material will have a pronounced effect on the properties of the insulation. Of particular importance is its effect on the power factor and dielectric constant. The curves shown in Fig. 7 show the power factor to be essentially independent of density while the dielectric constant increases with increasing specific gravity. It will be noted that the power factors given here are somewhat higher than those shown previously. The data for this plot was obtained from specimens of

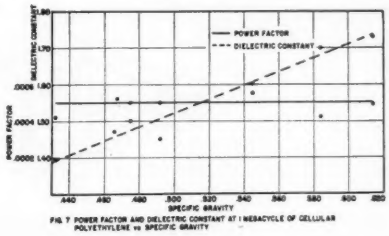

FIG. 7 POWER FACTOR AND DIELECTRIC CONSTANT AT 1 MEGACYCLE OF CELLULAR POLYETHYLENE vs SPECIFIC GRAVITY

brown material. The colorants used to obtain the brown color have the effect of slightly increasing the power factor.

★ ★ ★

For many applications a higher density than .47 may be required. This can readily be achieved by blending the cellular stock with a solid polyethylene compound to obtain the desired density. While it is possible to get higher densities by extruding at reduced temperatures and thus limiting the extent of blowing it has been found extremely difficult to reproduce results. In every case it is recommended that all of the blowing agents be utilized.

(*Please turn to page* 339)

Government Wire Production Information

Critical Material Purchases In 1953

Quantities bought through December 31, 1953, under the Government's purchase programs for domestic tungsten, manganese, chrome, mica, beryl, asbestos and columbium-tantalum were announced in January by **Edmund F. Mansure,** Administrator of General Services.

★ ★ ★

The programs were established to stimulate the search for and production of strategic and critical materials in the United States. These programs, Mr. Mansure pointed out, are separate from the exploration program of the Defense Minerals Exploration Administration, Department of the Interior.

★ ★ ★

Tungsten. Tungsten concentrates under the Government purchase program are accepted at various milling points, mostly in the West. The regulation setting up the tungsten purchase program was published in the Federal Register on May 11, 1951. Purchase of 3,000,000 short ton units (20 pounds each) of contained tungsten has been authorized. Delivered to date: 599,893 short ton units.

Manganese. Manganese is accepted at four depots—Butte and Philipsburg, Montana; Deming, New Mexico; and Wenden, Arizona. Manganese is also accepted in carload lots at any rail point in the country. The quantities authorized are: 6,000,000 long ton units (22.4 pounds each) of contained manganese for Butte and Philipsburg together; 6,000,000 long ton units for Deming; 6,000,000 long ton units for Wenden, and 19,000,000 long ton units for the carload program. Delivered to date: Butte and Philipsburg, 428,809 units; Deming, 789,618 units; Wenden, 2,089,283 units; carload program, 557,252 units.

Chrome. Chrome ores and concentrates are accepted at a depot at Grants Pass, Oregon. Purchase of 200,000 long tons of ores and concentrates has been authorized. Delivered to date: 46,640 long tons.

Mica. Mica is accepted at three depots—Spruce Pine, North Carolina; Custer, South Dakota, and Franklin, New Hampshire. It is accepted in three forms—block, film and hand-cobbed. Under a revision of the program announced July 23 the depots now will accept nonruby mica, subject to electrical tests, as well as ruby mica. Purchase of 25,000 short tons of hand-cobbed mica or the equivalent has been authorized. (For purposes of the program, 90 pounds of block or film mica are considered as the equivalent of one ton of hand-cobbed mica.) Delivered to date:

MICROMETER PRECISION — MICRO-WELD — TRADE MARK REGISTERED

MODEL M-T, FOR BENCH MOUNTING

This welder was designed and developed expressly for welding all types of fine wire: Aluminum, Copper, Brass, Bronze, Steel and Steel Alloys, ranging in size from .005" to .020" diameter.

Unit design of frame, transformer and power sub-assemblies permit other range of sizes to suit requirements.

Equipped with a temperature indicating annealing and tempering device, voltage regulator and meter to compensate for voltage fluctuation, wire cutters, extra large 5" diameter magnifying glass, fluorescent light and extension cord. Welder can be supplied for bench mounting, or mounted on 4-wheel truck.

The adaptability of this unit for welding all types of wire, either ferrous or non-ferrous, in sizes from .005" to .020" diameter, makes it ideal for the fine wire manufacturer.

MICRO PRODUCTS CO.,

20 NO. WACKER DR., CHICAGO 6, ILL.
Telephone: STATE 2-7468

2,593 tons of all types at all depots.

★ ★ ★

Beryl. Beryl is accepted at three depots: Franklin, New Hampshire; Custer, South Dakota, and Spruce Pine, North Carolina. Authorized purchases: 1,500 short tons. Delivered to date: Total, in terms of program, 145 short tons.

Asbestos. Nonferrous crysotile asbestos in three grades, Crude Nos. 1, 2 and 3, is accepted at a depot at Globe, Arizona. Purchase of 1,500 short tons of Crude No. 1 and/or No. 2 has been authorized. Crude No. 3, which is accepted on a tie-in basis with the other two grades, is not figured into the quantity authorized. Delivered to date: Crude No. 1 and No. 2, 352,000 pounds; Crude No. 3, 300,000 pounds. Total, in terms of program, 176 tons Crude Nos. 1 and 2.

Columbium-Tantalum. Columbium-tantalum ores and concentrates are accepted in small lots at three depots—Custer, South Dakota; Franklin, New Hampshire, and Spruce Pine, North Carolina Columbium-tantalum in lots of 2,000 pounds and over is purchased from both domestic and foreign sources through four agents—Fansteel Metallurgical Corporation, North Chicago, Ill.; Wah Chang Corporation, New York, New York; Kennametal, Inc., Latrobe, Pennsylvania, and Emergency Procurement Service, GSA, Washington, D. C. Delivered to date (Foreign and Domestic combined): 3,485,507 pounds.

duPont to Produce Titanium

The General Services Administration has announced that it has reached an agreement with the **E. I. DuPont de Nemours Company,** of Wilmington, Delaware, under which the company will begin design and engineering studies toward the erection of a plant to produce between 7,000 and 8,000 tons of titanium annually.

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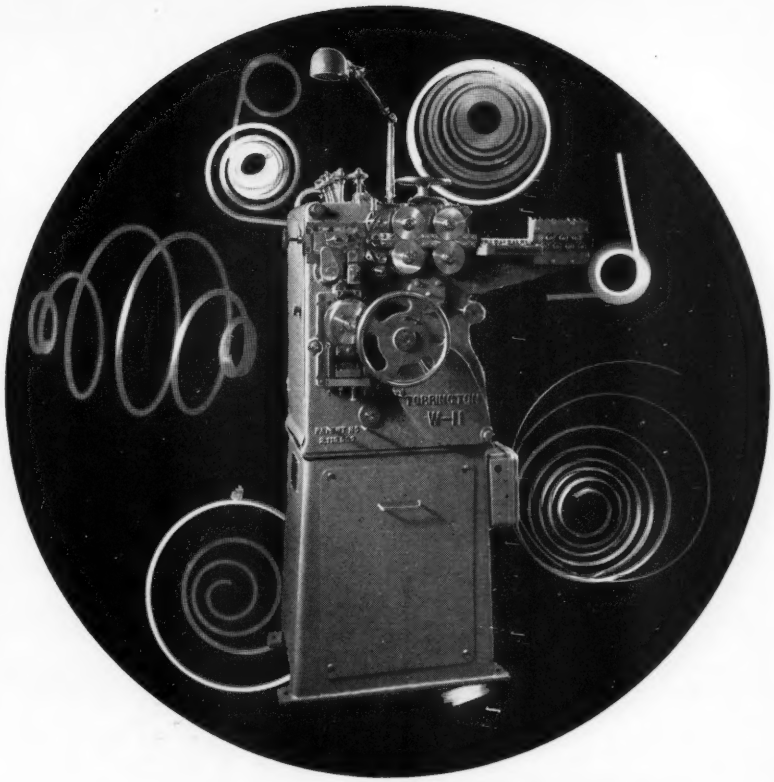
Edmund F. Mansure, Administrator of General Services, said DuPont will spend a maximum of $600,000 of its own funds in engineering studies and preparation of drawings preliminary to possible construction of a plant which may



VERSATILE TORRINGTON SPRING COILER

SPECIFICATIONS
of the Model W-II Spring Coiler

The 14 different Torrington Spring Coilers cover a range of wire diameters from .003" to .750".

Wire diameter range: .015" to .072"

Wire Length per Spring: 0" to 42" (Extra wire Feed Gears Available)

Coil Range (O.D.): 3/32" to 1-9/16"

Production: 23 to 190 springs per minute with variable speed drive.

Torsion and other attachments are available.

In spring coiling, the words "Torrington" and "Versatile" are synonymous! When you desire springs produced to meet exacting requirements, just call the professional springmaker who has a Torrington coiler. He's the man who can fill your needs with accuracy, speed and economy. On special springs, our sales department will gladly assist you in finding a source of supply, or help your springmaker devise just the right tooling to produce it.

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TORRINGTON
MANUFACTURING COMPANY
TORRINGTON, CONNECTICUT

The REEL News is that STEEL Costs Less!

Steel is **DURABLE**
Tests now being conducted indicate a life of 12 times that of wooden reels. Minimum maintenance.

Steel **COSTS LESS**
Although its cost initially is about 30% higher, its longer life results in at least a 400% saving.

Steel **PROTECTS**
The cost of a reel is infinitesimal compared to the value of cable it carries. Drop it, bounce it, handle it roughly. Steel stands up and protects your investment.

Steel is **RUGGED**
Steel reels do not warp, bulk less, carry more payload. Precision made, weatherproof, balanced.

NYECO REELS — **SHIPPING REELS** *(I-Beam or Channel)* — **PROCESSING REELS** *Heavy-Duty* — **DRUMS and FLANGES** *available separately*

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NYECO is now furnishing Steel Reels to America's leading mills, including Phelps Dodge, Anaconda, General Cable, Roebling, Western Electric, Okonite. Without obligation, inquire for quotations on your specifications. Large plant, automatic production facilities, flexible set-up, with motor, rail, and water shipping facilities at the premises, insure accurate work, prompt deliveries, competitive prices, on large or small orders.

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- **ANY QUANTITY**
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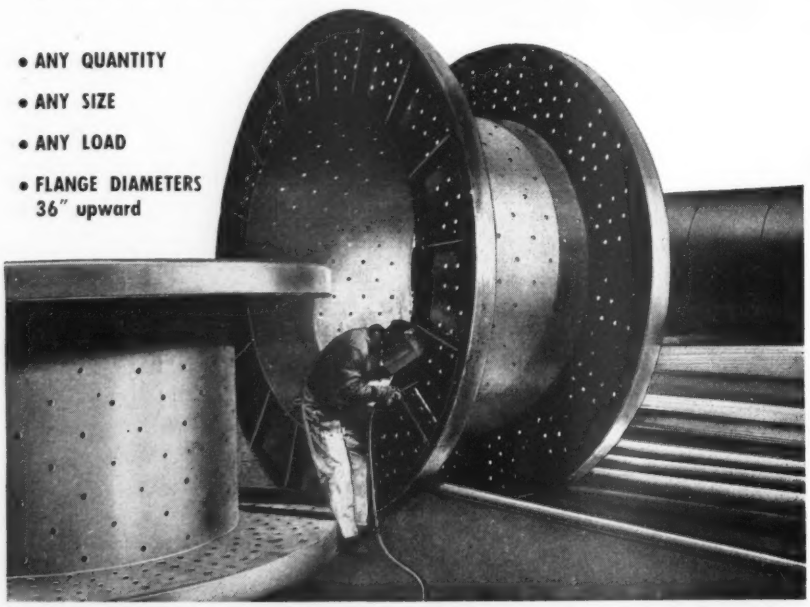
- **ANY LOAD**
- **FLANGE DIAMETERS 36″ upward**



cost between 30 and 35 million dollars.

★ ★ ★

There is no contract yet for the building of a plant, but the data are needed so that it will be possible to conclude negotiations with the company for the additional production.

★ ★ ★

If a satisfactory agreement can be arrived at concerning financing, construction of the plant will get underway. If built, the plant will be located in Tennessee, on a site adjoining the TVA steam power plant between Waverly and Camden.

★ ★ ★

In the event the Government asks DuPont to cease engineering work before September 1, 1954, or if no satisfactory purchase contract can be arrived at, the Government will reimburse the company's outlay, not to exceed $600,000.

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GSA already has a contract with DuPont for production of 13,500 tons of titanium over a five year period. The agency also has contracted with the Titanium Metals Corporation of America to produce 18,000 tons over a five year period, and with Cramet, Inc., to produce 6,000 tons annually. At Boulder City, Nevada, a Government owned pilot plant is producing 20 tons per month.

More Nickel to Come from Cuba

The National Lead Company, a leading American mining and metallurgical company, will carry out an expansion program that will increase the capacity of the Government-owned nickel plant at Nicaro, Cuba, by 75 per cent.

★ ★ ★

The company, owner of the majority share of the firm, Nickel Processing Corporation, which is presently operating the plant, will enlarge it under the direction of the **General Services Administration.**

★ ★ ★

The Office of Defense Mobilization has directed the expansion and

allocated $43,000,000 to the project. Completely rehabilitated at the order of the Munitions Board of the Department of Defense, in 1950, the plant turned out in 1953 about 28 million pounds of nickel and, in the fourth quarter, the equivalent of an annual rate of 29½ million pounds.

★ ★ ★

National Lead will employ subcontractors for various phases of the work—engineering plans, specifications and design of the expanded facilities, and their construction. For the selection of the subcontractors, standards have been established to cope with the special problems to be found in an undertaking in a foreign country.

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To this end, **H. C. Wildner,** president of Nickel Processing Corporation and an officer of National Lead, has assured the General Services Administration that the qualifications of the subcontractors will include their past experience in and present facilities for the performance of work in Cuba.

★ ★ ★

"The rehabilitation and operation of Nicaro," Mr. Mansure pointed out in explanation, "has had splendid cooperation in Cuba from the government and the people. In a very real sense, they are in partnership with us in an operation which is based upon Cuban resources in nickel and other metals. We wish to maintain in that partnership the same spirit of friendship and cooperation."

How to Get ASTM Standards

Whenever a person or concern wants a copy of an ASTM standard, this can be supplied at a small charge by the Society. New and revised specifications are constantly becoming available. The charge for anyone of these is usually 25 cents each, although if one occupies more than 16 pages, it will be slightly higher. Send such requests, with a remittance, to the **American Society for Testing Materials,** 1916 Race St., Philadelphia, Pa.

AMERICAN CHEMICAL PAINT COMPANY

AMBLER CHEMICALS ACP PROCESSES PENNA.

Technical Service Data Sheet

Subject: EFFICIENT PICKLING WITH RODINE®

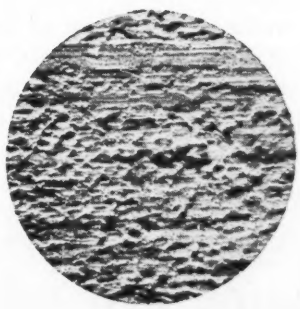
ADVANTAGES OF "RODINE"

RODINE is used in sulfuric and muriatic acid baths for improved pickling and increased production. It meets Government Specification U.S.N. 51-I-2.

In straight line pickling of wire, rod and tubing, RODINE makes available more metal for drawing by protecting steel from acid attack. In batch pickling of sheet steel, RODINE improves the surface. In rapid, continuous strip pickling, RODINE not only saves acid and metal, but also prevents over-pickling during line shutdowns.

◀ *This steel surface was pickled in an uninhibited acid bath. Note the deep pits, and that the surface is visibly crystalline.*

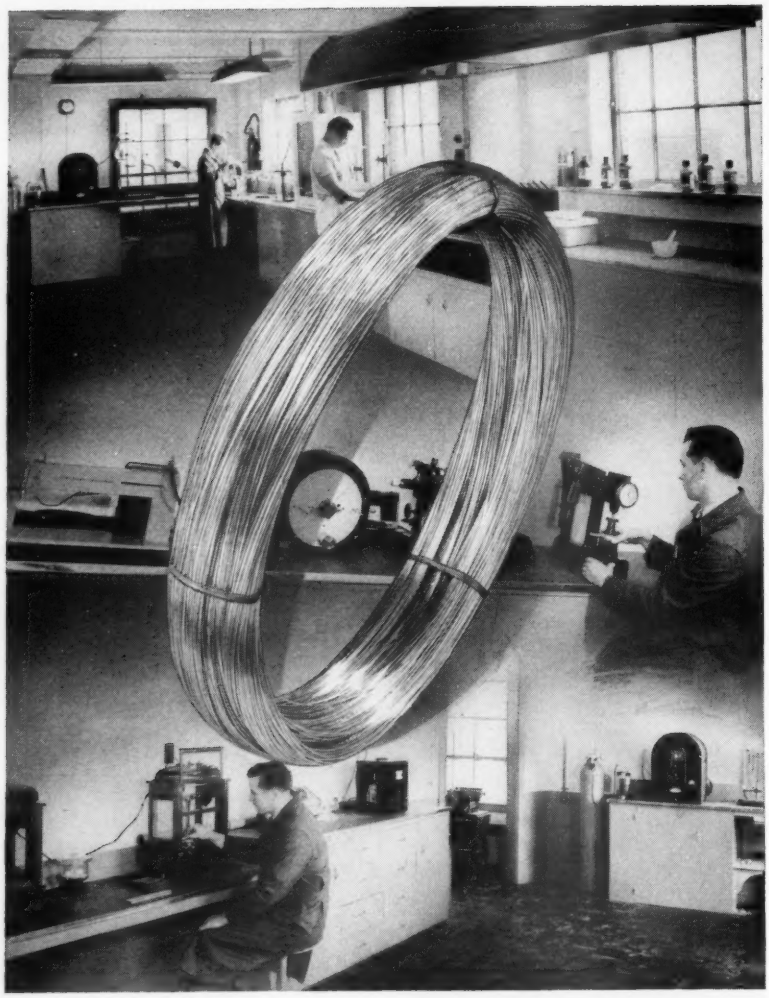
This surface was pickled exactly like the one above except that "RODINE" was added to the acid solution. Only scale pockets and roll marks are visible; no pitting occurred. ▶



CHEMICALS ACP PROCESSES

WRITE FOR DESCRIPTIVE FOLDER ON "RODINE" AND INFORMATION ON YOUR OWN PICKLING PROBLEM.

CHEMICALS ACP PROCESSES



All Johnson Specialty Wires Are Drawn Under Laboratory Control

Franklin discovered electricity but the man who invented the meters made the money.

The original drawers of wire—whether in Europe or nearby Spencer naturally had no idea of the scientific value of the future of their process—drawing metal through a hole smaller than the original workpiece. But they did have a sound principle, that has been carried through in modern processes which here at Johnson include absolute uniformity of prescribed physical and metallurgical properties and scientific application of special skills to produce the best in specialty wires—always under Johnson laboratory control.

JOHNSON STEEL AND WIRE COMPANY, INC.

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A SUBSIDIARY OF PITTSBURGH STEEL COMPANY

ABSTRACTS

FINE TUNGSTEN AND MOLYBDENUM WIRE FOR ELECTRON TUBES. II

C. C. Gee (Mullard Ltd). Wire Ind 1953 Vol. 20 (239) pp 1075, 1077-1078, 1080, 1083 (Nov)
(Cont). See Bibl Ind Diamond Appl 1953 Vol 10 p B445 (Dec).

Details of manufacture and testing of tungsten wire at Mullard Wire Factory, Blackburn, those for chemical processing also applying to molybdenum wire. Mechanical processing: tungsten powder pressed into rectangular bars, and reduced to final wire by sintering and drawing. During sintering, sample cut from bar, ground and polished with emery and diamond dust, etched and checked for grain size and distribution. Swaging for reduction to about 2.5 mm dia. Wire reduced on chain-drawing bench using tungsten carbide dies heated to 850 deg C to about 1.25 mm dia; on drum and spool drawing machines to 420 micron; then on individual drawing machines. Total process involves drawing through about 100 dies. Wire annealed when reduced to about 180 micron dia; change-over from carbide to diamond dies at 170 micron. Reduction to 7 micron dia involves 70 to 80 diamond dies at progressively lower temp; final temp about 500 deg C. Subsequent treatment according to use; electrolytic etching for wire under 7 micron dia.

Diamond dies produced at factory: 2 parallel flats made perpendicular to direction of channel. Facet polished perpendicular to flats permits following drilling with microscope. For drilling cone, diamond mounted with one polished flat face on end of rotating spindle, and cone drilled in opposite flat by blunt steel needle rotating at high speed and fed with diamond powder suspended in oil. Drawing channel ground with long pointed needle; diamond reversed for drilling back relief. Channel polished with hair-fine needle fed with diamond dust. Diamond dies made from 7 to 2,200 micron dia, but those exceeding 170 micron rarely used in tungsten wire drawing. Quality control on diamond die condition maintained by checks on wire die and roughness during fine drawing. 7 illustr.

R **C 11.0 : D 11.0**

★ ★ ★

DIE KONTROLLE DES DRAHTZUGES. THE CONTROL OF WIRE DRAWING

O. Herrmann. Draht 1953 Vol 4 (10) pp 373-377 (Oct) (In German)

Quality of drawn wire usually only tested on finished reel, leading to waste of labor and material. Final quality influenced by reduction ratio, die friction, die angle, and shear resistance of material. E. Siebel gives formula relating these quantities to drawing force, ignoring effect of drawing speed and temp. Drawing force on diamond die registered and recorded. Sudden large variations indicate alteration in drawing conditions due to die wear or cracking or irregularities in wire die.

Indicator developed. Drawing force acts against strip springs which activate sensitive pointer over scale with central zero. When pointer touches movable contact on scale, pilot lamp lights up. Instrument allows continuous process control; gives early warning of deterioration of diamond die so that repolishing easily possible. Spring on die also facilitates starting and reduces risk of wire

breakages. 10 illustr, 3 ref.
H C 11.0

★ ★ ★

STAINLESS STEEL WIRE DRAWING THROUGH DIAMOND DIES

W. F. G. Kerley (Samuel Fox & Co Ltd). Wire Ind 1953 Vol 20 (239) pp 1095-1096, 1099-1100, 1103-1106, 1113 (Nov)

Historical background of stainless steel wire and diamond drawing. Use of large low-quality stones in silver solder mount superseded by smaller high-grade diamonds without mount. Description of modern fine wire mill. Specialized knowledge and training important, especially in diamond die maintenance section. Origin of diamonds: division into alluvial and mined. Physical properties (claim that characteristics vary with mine or source), crystallography, grain orientation and polishing directions. Diamond dies usually have drawing axis near 2-point direction: sometimes near 3-point. Four-point presents polishing difficulties, though claimed ideal for max die life. Mounting material should give reinforcing qualities of silicon cast iron, but avoid high temp required for deposition. Risk of burning obviated by encasing diamond prior to drilling. Die failure occurs lateral from point of wire impingement. With hard soldered and low melting point mounting media, failure occurs along cleavage plane. Diamonds easily cleaved by shock, except for carbonados; these take no high polish, and are rarely used as dies. Needle or broach type machines recommended for repolishing; should be used only for close finishing with 0 to 3 micron diamond powder, max 6 micron and 0.0003 in. stock removal.

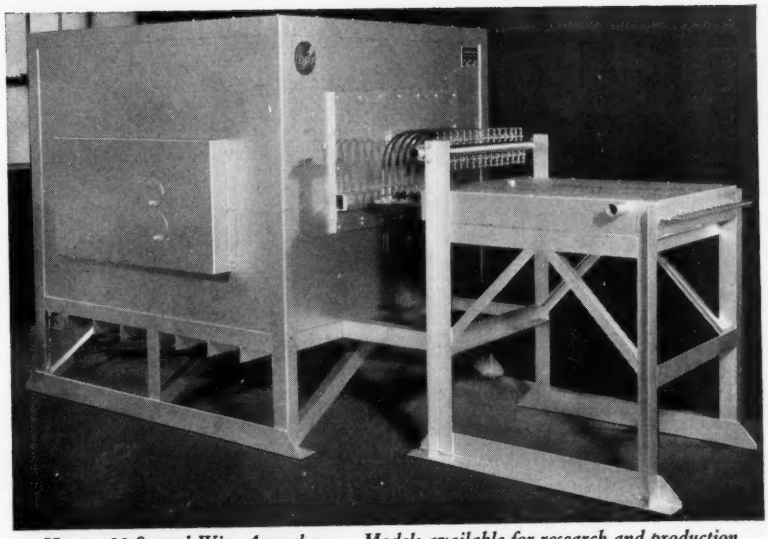
Starting sizes for diamond drawing stainless steel and nickel-chromium wire are 0.040 to 0.028 in. dia; finishing from 0.036 to 0.001 in. or finer. Lead coat may be applied for drawing 14 or 15 gauge stock; removed at 18 or 19 gauge. Reduction from 0.036 to 0.124 in. on 9-die machine at 600 ft/min finishing speed, dies being loaded in reciprocating holder. Wear rate greatest at largest die, with progressive decrease, possibly due to decrease of friction caused by crystal flow in direction of applied stress in first stages. Water soluble lubricant generally used. Swift H general-purpose oil found effective in short test run. High die wear rate in drawing fully softened stainless wire countered by reduction in coiling from annealing furnace, using sintered carbide dies and chlorinated paraffin wax or beeswax and trichlorethlene. Rethreading should be avoided by using good butt welder. (Prize winning paper.) 11 illustr.
R C 11.0 : D 11.0

★ ★ ★

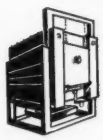
TINY SPLIT DIE

Pratt & Whitney Div, Niles-Bement-Pond Co. Steel 1953 Vol 133 (19) p 111 (Nov 9)

Wire drawing die no bigger than match head ground recently with Diaform diamond wheel to tolerances ±0.0002 in. Preliminary template of 100:1 instead of usual 10:1 ratio required; this, made of 3/32 in. flat stock, used with Diaform and 100-GV wheel to produce 10:1 template. Two pieces of correct die wire then placed in V block and ground to required form and thickness.
Y C 12.2 : D 11.0



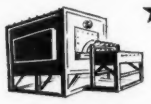
Harper 30 Strand Wire Annealer . . . Models available for research and production



with the modern

HARPER MULTIPLE STRAND WIRE ANNEALING FURNACE

Offers you these advantages



★ Continuous trouble-free round-the-clock production.

★ Wire is bright and clean upon leaving furnace, eliminating costly cleaning operation.

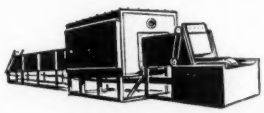
★ Uniform product, because of close control of temperature and protective atmosphere.

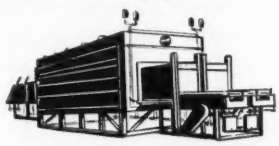
★ Spoilage is practically eliminated.

★ Savings in valuable floor space. The Harper multiple strand wire annealing furnace is a compact high production unit.

★ Savings in man hours . . . only a mininum of operator attention is required.

Consider these important savings. They will soon pay for replacement of inefficient or outmoded equipment.





Furnace Builders *for over 30 Years*

HARPER
Electric Furnace Corp.
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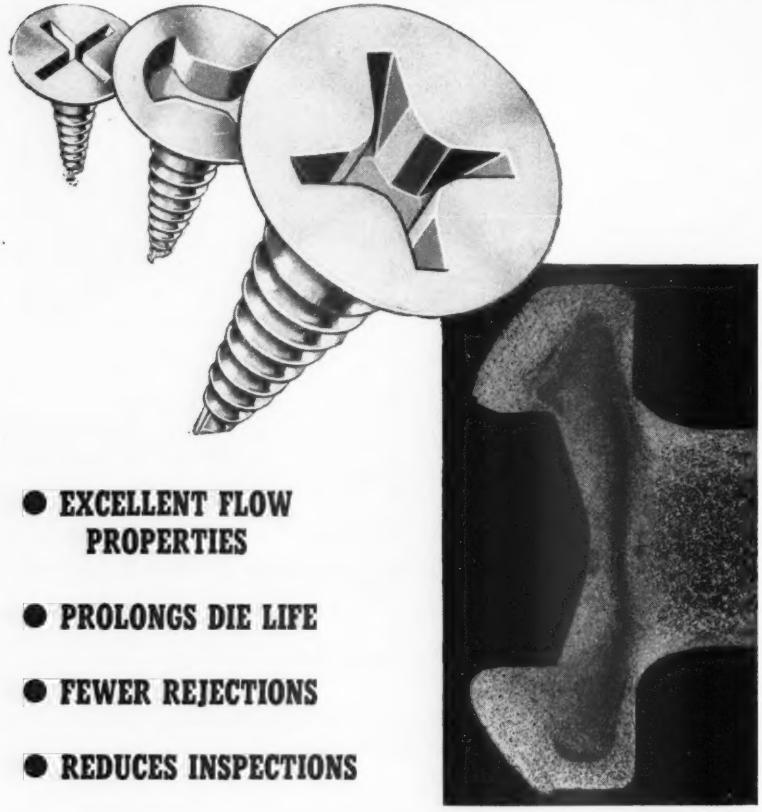
KEYSTONE "SPECIAL PROCESSED" COLD HEADING WIRE



- EXCELLENT FLOW PROPERTIES
- PROLONGS DIE LIFE
- FEWER REJECTIONS
- REDUCES INSPECTIONS

The excellent grain flow properties of this superior cold heading wire assures the desired upsetting and die forming qualities you need for greater efficiency in the production of Phillips head, clutch head and cross-recessed head screws.

The structural soundness and uniformity of Keystone "Special Processed" Cold Heading Wire is attained by careful selection of raw materials, our own exclusive drawing and heat treating process, rigid quality controls and inspections. Compare the performance of Keystone "Special Processed" Cold Heading Wire next time you have a difficult cold heading problem to solve.

INDUSTRIAL WIRE SPECIALISTS

Keystone Steel & Wire Company
PEORIA 7, ILLINOIS

STEEL DRAWING

M. Schneider. Polish Techn Abstr 1953 (2) p 37 (Original in Polish)

Book, PWT, Warsaw, 223 pp. illustr, 1951. General notes on drawing process. Preparing surface of wire for drawing. Theoretical principles. Wire and rod-drawing. Drawing equipment. Friction and lubrication during drawing. Drawing machines. Changes occurring as result of drawing, in properties of materials. Regeneration of distorted materials. Patenting.

X **C 11.0**

★ ★ ★

NEEDLE TUBE PRODUCTION

Superior Tube Co., Norristown, Pa. Steel 1953 Vol 133 (18) pp 90-91 (Nov 2)

Austenitic chromium nickel stainless steel received at mill as seamless tubing, 1.5 in. outer dia by 0.125 in. wall. Final drawing is from 0.31 to 0.035 in. outer dia. Elimination of annealing after temper point requires special measures to cope with increasing hardness of material: in final sinking operations tubing has become so hard that diamond dies used. Illustr polishing of diamond drawing die with lap tool, as quality control measure; diamond paste applied to die with hypodermic syringe. 5 illustr.

Y **C 11.0 : D 11.0**

★ ★ ★

DRAWING DIE WIRE POLISHING MACHINE

S. Eder, Wien-Oberlaa. Ind Diamond Rev 1953 Vol 13 (156) pp 260, 262 (Nov)

Double spindle machines following Bsteh pattern giving 5 different movements: (a) rotation of drawing die; (b) reciprocating movement of polishing wire in drawing die caused by cam with 80 oscillations per min; (c) slow feed of new wire through moving-up of tool holder; (d) super-imposed adjustable oscillations of 500, 1,000, 3,000 and 4,000 strokes per min; (e) automatic oscillation of drawing die holder in range from 8 to 28 deg of arc. Operation with steel wire, copper wire or steel needle. (1080).

G **D 11.0**

★ ★ ★

INFLUENCE OF CUPROUS OXIDE CONTENT UPON THE DRAWING PROPERTIES OF ANNEALED, GALVANICALLY ZINC-COATED COPPER WIRES

F. Lihl. Metall 1953 Vol 7 p 324; Chem Abstr 1953 Vol 47 (15) col 7421 (Aug 10) (Original in German)

Y **C 11.0**

★ ★ ★

These Abstracts are provided by and through the courtesy of the Industrial Diamond Information Bureau, 32 Holborn Viaduct, London E. C. 1, Eng. For further information, please write the Bureau.

New Cable Links Europe and South America

The longest single polyethylene-insulated cable ever laid now links Europe with South America across the South Atlantic. Because of the low dielectric constant of polyethylene, a smaller cable is possi-

ble which, in turn, leads to a reduction in over-all weight and in cost.

* * *

Four European cable manufacturers in England, France, Germany and Italy produced more than 1,750 miles of this cable insulated for the most part with polyethylene supplied by Bakelite Company, a Division of Union Carbide and Carbon Corporation. The new cable stretches 1,758 nautical miles across the South Atlantic from Recife, Brazil to St. Vincent in the Cape Verde Islands, off the west coast of Africa. The deep-sea portion of the cable—98 per cent of its total length—lies at depths well over 13,800 feet and attains 19,800 feet at one point, more than 3½ miles down.

* * *

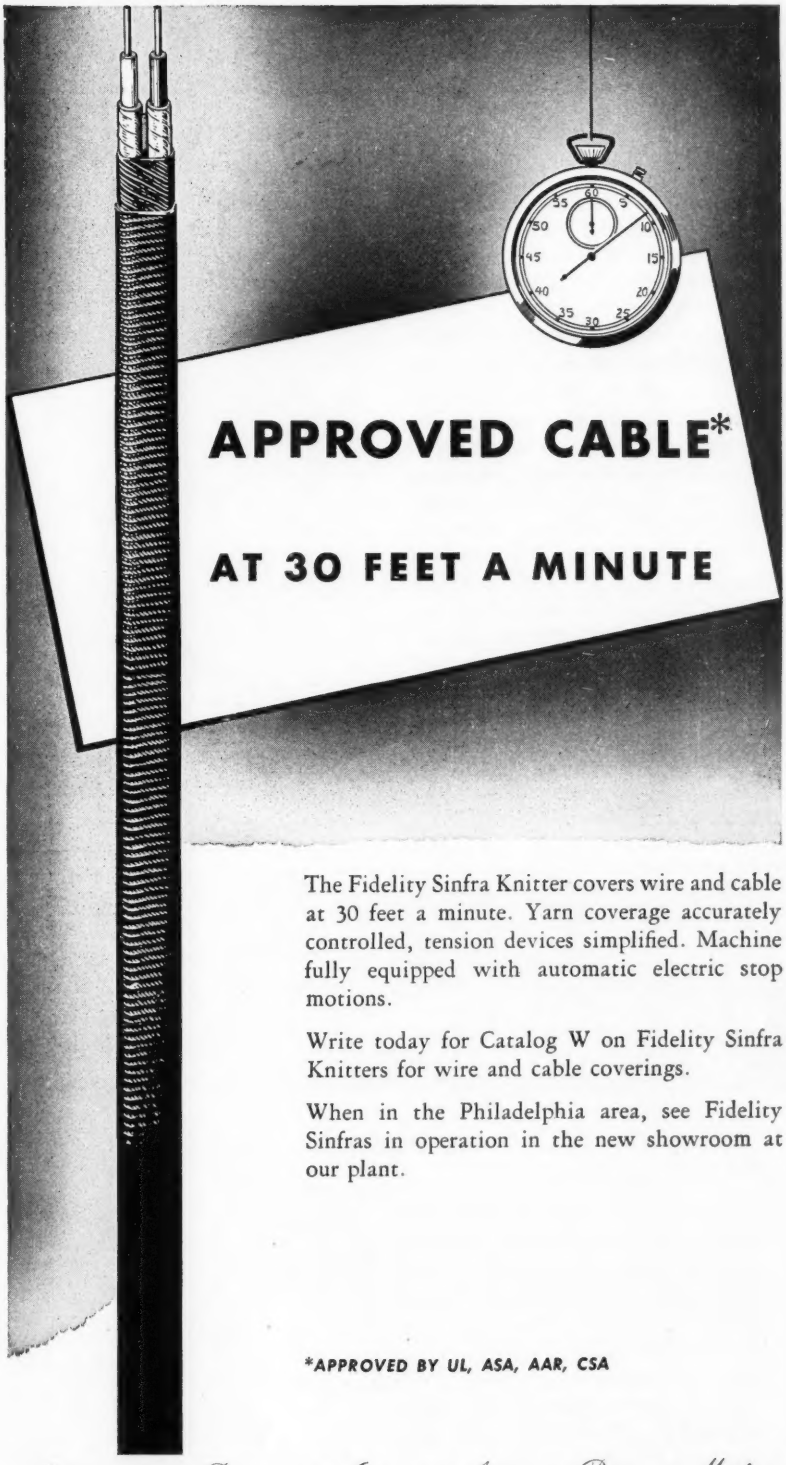
The cost of this cable with a gutta-percha core (previously used for submarine cable insulation) would have been about 58 per cent higher than the cost of polyethylene core cable. A 25 per cent saving in the amount of copper used for the conductors is due to the low dielectric constant of polyethylene. The new cable required 13 per cent less steel wire to bear its own weight. Savings of more than 17 per cent in jute yarn for the core, and more than 7 per cent in outer-serving jute twist were also obtained by using polyethylene for insulation.

New Die Specification and Price Bulletin

Latest information on standard cemented carbide die specifications and prices is included in bulletin D-134 announced by **Carboloy Department** of General Electric Company, Detroit.

* * *

The new publication lists round hole dies, rough cored and finished, braze-type rough mandrel nibs, finished tube-drawing mandrels, square and hexagon shape dies, nail gripper and header die nibs, guide rings and wire guide bushings.



The Fidelity Sinfra Knitter covers wire and cable at 30 feet a minute. Yarn coverage accurately controlled, tension devices simplified. Machine fully equipped with automatic electric stop motions.

Write today for Catalog W on Fidelity Sinfra Knitters for wire and cable coverings.

When in the Philadelphia area, see Fidelity Sinfras in operation in the new showroom at our plant.

*APPROVED BY UL, ASA, AAR, CSA

Designers and Builders of Intricate, Automatic Precision Machines

FIDELITY MACHINE COMPANY, INC.

SINCE 1911

3908-18 FRANKFORD AVENUE, PHILADELPHIA 24, PA.

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25 Beaver Street, New York 4, N. Y.

Canadian Representative:
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Outstanding Personalities of the Wire Industry

Scovill Names New Director, Promotes Three Executives

Directors of **Scovill Manufacturing Company** elected a new member to the Board and made three executive appointments, it was announced by L. P. Sperry, president, following the monthly meeting of the board in January.

★ ★ ★

Sherman R. Knapp, president and director of the Connecticut Light & Power Company, Berlin, Conn., was named director, succeeding the late **Lester J. Ross.**

★ ★ ★

Executive changes with respect to the affairs of two divisions include **Garvin A. Drew** as vice president and **George W. Gross** as assistant vice president of the A. Schrader's Son Division, Brooklyn, N. Y., and **George W. Young,** assistant vice president of the Oakville Company Division, Oakville, Conn.

Elected President of Ajax Electric

At the annual meeting of **Ajax Electric Company, William Adam, Jr.** was elected President after **Dr. G. H. Clamer** announced his desire to retire from that office. **John E. Haig** and **Leon B. Rosseau** were elected Vice Presidents.

William Adam, Jr. * * * * * * *

★ ★ ★

Dr. Clamer will continue as President of Ajax Electro Metallurgical Corporation, Ajax Electrothermic Corporation and Ajax Engineering Corporation.

Elected Vice President of Pittsburgh Screw

Robert McNeal Smith has been elected a vice president of **Pittsburgh Screw & Bolt Corporation.** Formerly assistant vice president of sales, he has served the corporation in various sales capacities since 1941. From 1949 until 1952 he was eastern manager of sales in charge of the New York and Philadelphia offices, and for six years before that was sales manager of the New York district.

★ ★ ★

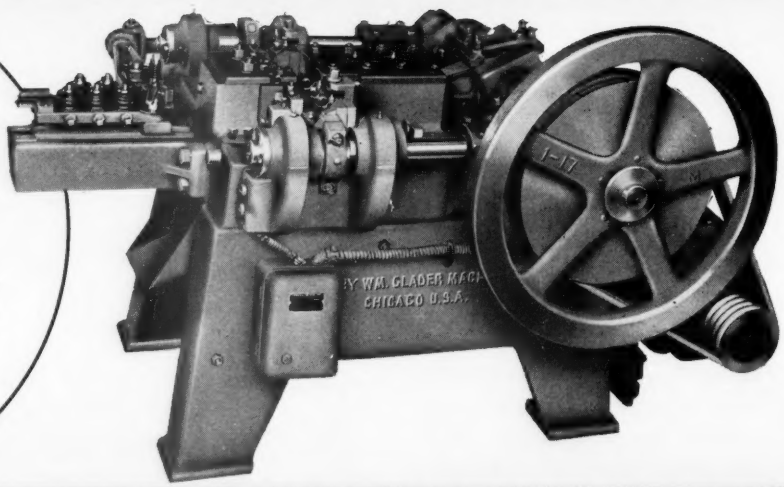
GLADER

HIGH SPEED WIRE NAIL MACHINES

HIGH TONNAGE OUTPUT—LOW MAINTENANCE COST

You can take care of increased production schedules and better product demands with these machines of established reputation.

For 55 years GLADER MACHINES have been giving HIGH QUALITY, LOW COST nail production.



Wm. Glader Machine Works 210 N. Racine Avenue Chicago 7, Illinois

Export Dept.: 122 E. 42nd Street, New York 17, N. Y.

He is a graduate of the Hill School, Pottstown, Pa., and of Yale University. Mr. Smith will continue to maintain offices in New York City in the International Building, Rockefeller Center.

Hitemp Names General Sales Manager

Hitemp Wires, Inc., Mineola, L. I., one of the country's largest producers of high-temperature insulated wires, has appointed **George D. Newman, Jr.,** to the position of General Sales Manager. Mr. Newman will administer the company's marketing program and supervise the work of all sales representatives throughout the U. S. and Canada, according to **George F. Rolfe,** president of the corporation.

★ ★ ★

Before joining Hitemp, Mr. Newman was associated with the Minnesota Mining and Manufacturing Company for ten years. He was responsible for the sale of electrical insulating products in Metropolitan New York and Connecticut. He is a native New Yorker, is married, and lives on Long Island.

★ ★ ★

The position of General Sales Manager was formerly held by **Robert Weitzen** who is now Vice-President of Advertising and Market Research. Mr. Weitzen helped organize Hitemp, and assisted in developing some of the confidential wire-insulating techniques now being used by the firm.

Carboloy Appointments

Harry H. Jason, manager-tool sales, **Carboloy Department of General Electric Company,** Detroit, Mich., has been named manager of the Department's newly created New England sales district, effective Jan. 1st, with headquarters in Wellesley, Mass.

★ ★ ★

Mr. Jason joined Carboloy in 1946. He was first a sales and service engineer in San Francisco, being named to his present post in November, 1950. Earlier, he was a sales and service representative for Morse Twist Drill and Machine Co., New Bedford, Mass.

★ ★ ★

Alfred M. Thomson Jr., sales representative for Detroit, Mich., has been named manager-East Central District Sales with headquarters in Cleveland, O., effective Jan. 1st.

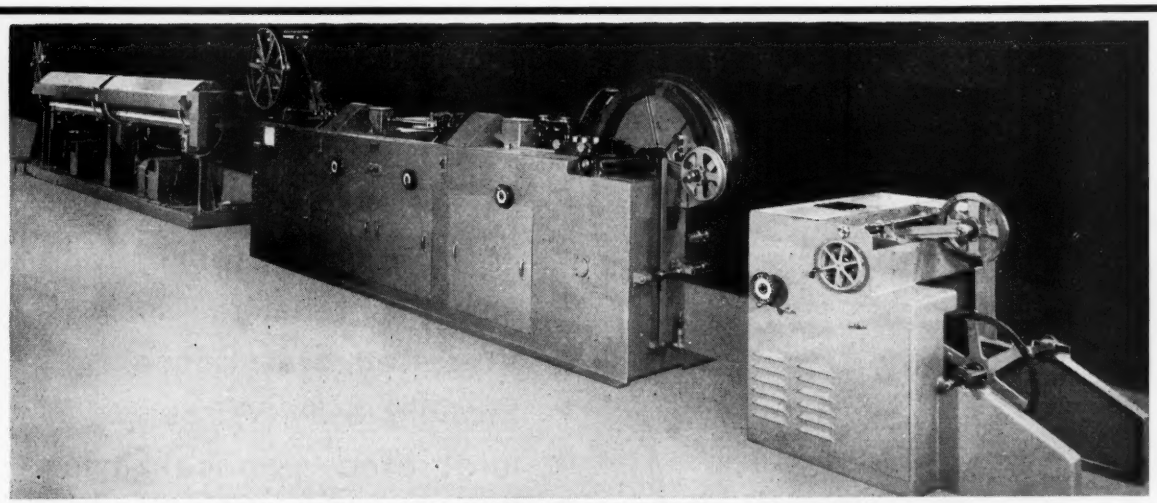
★ ★ ★

Mr. Thomson joined the organization in 1940, in the sales order department. He became a sales and service engineer in 1945. He holds a B.S. in Mechanical Engineering from Lafayette College, Easton, Pa., He is filling a post formerly held by **W. S. Baker,** who becomes manager of tool sales in Detroit.

★ ★ ★

J. D. Kennedy, manager of product projects at Detroit, Mich., has been named manager of the Department's newly-created South Central sales district with headquarters in St. Louis effective Jan. 1st.

★ ★ ★



4D-1-BB GLASS INSULATION WIRE COVERING MACHINE **No. 1088** Patented Aug. 3, 1943

WITH VARIABLE SPEED DRIVE.
TORQUE MOTOR DRIVEN TAKE-UP REEL STAND
BALL AND ROLLER BEARING MOUNTED
BAKING OVEN WITH DOUBLE VARNISH APPLICATOR
AND AUTOMATIC TEMPERATURE CONTROLS.

WIRE DRAWING, ENAMELING, TINNING, INSULATING,
TAPING, GLASS-COVERING, PANNING AND ALLIED MACHINERY

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"American" INSULATING MACHINERY COMPANY
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PHILADELPHIA 33 PENNSYLVANIA U.S.A.

Mr. Kennedy joined Carboloy Department in Feb., 1948, as a general trainee. He became a sales engineer in April, 1949, and was named manager of wear part sales in July 1950. He assumed his present duties in November, 1952. He received a B.S. degree in mechanical engineering from the University of Michigan in 1948.

Industrial Ovens Changes in Personnel and Manufacturing Facilities

The Board of Directors of **Industrial Ovens, Inc.** has announced that the reorganization of the company has been completed in accordance with plans undertaken a year ago.

★ ★ ★

Personnel changes of the reorganized corporation include the following: **Howard R. Richards** has been elected President and General Manager; **Sloane E. Allen** is Vice President and Treasurer; **Louis A. Litzler,** Secretary. **E. W. Baumgardner** has been appointed Sales Manager and **A. V. Alexeff,** Chief Engineer.

★ ★ ★

Industrial Ovens, Inc., 13825 Triskett Road, Cleveland 11, Ohio designs, manufactures and installs continuous materials handling and processing systems, generally involving the engineered application of heat, for the rubber, plastics, paper, textile, film and wire industries.

Howard R. Richards * * * * * *

★ ★ ★

IOI's design staff now offers registered engineering consulting service. A completely equipped structural steel fabricating and machine shop has been added to IOI's manufacturing facilities and the addition of a sheet metal shop is planned for the near future.

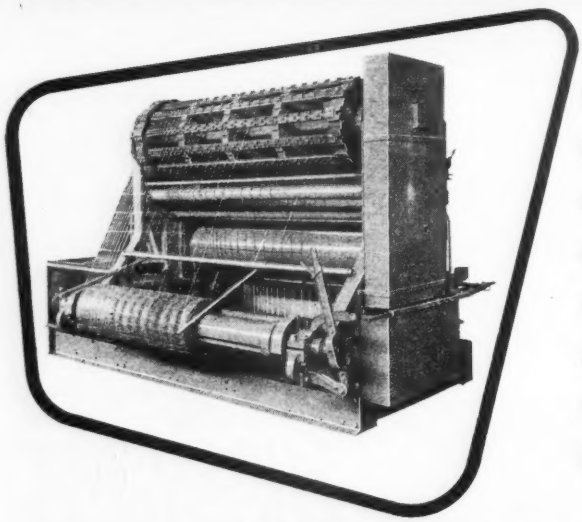
★ ★ ★

Mr. Richards became associated with IOI in October, 1952, as Vice President and General Manager.

Promat Appoints Swift Chemical

The Promat Division of Poor & Company, 851 South Market St., Waukegan, Illinois, has announced the appointment of the **Swift Industrial Chemical Company** of Canton, Conn. as eastern sales representatives for the PROMAT line of metal finishing processes. Included will be Probrite-White Alloy, Promat copper cadmium and

Interlocking FENCE LOOMS



- Fastest — Most Efficient
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Write for Detailed Information — Without Obligation

Interlocking Fence Co., Box 8, Morton, Ill.

Specialists In Fence Looms

zinc electroplating processes and Promat chromate treatments.

★ ★ ★

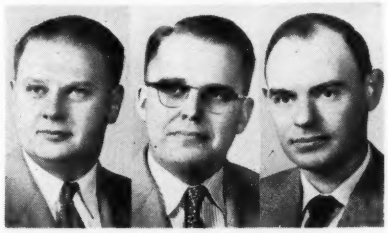
The Swift organization has been active in the manufacture and sale of metal finishing, treating, cleaning and descaling compounds since 1949. **John A. Swift,** president and technical director, a 1928 M. I. T. graduate, has served as assistant works metallurgist for the **American Steel and Wire Company** and chief metallurgist for the **Billings and Spencer Company.**

Atlas Mineral Announces Appointments

As part of its program of expansion, the **Atlas Mineral Products Company,** Mertztown, Pa., announces the following appointments and promotions: **Ernest Derr** will handle customer service at the Houston plant, **Walter Goethe** is in charge of development for the Thermoplastic Structures Division, and **Eric Van Anglen** has been assigned to field service for the Thermoplastic Structures Division.

Lee Wilson Promotes Three Executives

Lee Wilson Engineering Co., Inc., Cleveland, Ohio, engineers and manufacturers of annealing furnaces and equipment, announced three promotions in February. **W. E. Spaninger** becomes Director of Purchases and Production Manager, and also takes charge of assembly plant operations. **C. C. Blackman** becomes Assistant Chief Engineer and **R. R. Hill** takes over as Superintendent of the Service Department in charge of all field service and construction.



W. E. Spaninger C. C. Blackman R. R. Hill

★ ★ ★

William Watts, it was announced, is leaving to start his own manufacturers agent business.

Celanese Promotes Two Executives

Dr. Robert W. Work and **Dr. Russell O. Denyes** have been promoted to new positions with **Celanese Corporation of America.**

★ ★ ★

Dr. Work, formerly Assistant Manager in Charge of Textile Division Process Research at the Summit, New Jersey, laboratories, was named Assistant Manager of Plant Operations for the Textile Division.

★ ★ ★

Dr. Denyes, former head of viscose and new fiber research at Summit, succeeds to the post vacated by Dr. Work.

Electric Wire Executive Made Member of Controllers Institute

John E. Auchmoody, assistant to the president, **Simplex Wire & Cable Company,** Cambridge, Mass., has been elected to membership in

For Sale . . .

ONE—Hughesville 7 wire, 22" bobbin Strander Tube complete with cradles, etc. Condition new and unused.

ONE—Hughesville 6 wire, 13" bobbin, same as above.

Drive, haul-off and take-up for above machines can be furnished to customer's specifications.

For further information regarding prices and deliveries, write to

HUGHESVILLE MACHINE & TOOL CO.

54 W. Academy Street, Hughesville, Pa. Tel.: 129-A

Exclusive Representation in Canada by

THE LARSON COMPANY, TORONTO, CANADA

the Controllers Institute of America.

★ ★ ★

Established in 1931, the Institute is a non-profit organization of controllers and finance officers from all lines of business—banking, manufacturing, distribution, utilities, transportation, etc. The total membership exceeds 4,200.

John E. Reynolds

John Elliott Reynolds, 54, director of the **Ansonia Wire & Cable Company** and purchasing agent for the **Baird Machine Company,** died Sunday, January 24th, at his home in Stratford. The medical examiner's report indicated that death was due to a heart ailment.

★ ★ ★

He is survived by his wife, Mrs. Helen King Reynolds; a son, John E. Reynolds, Jr., of Elliott City, Md.; a daughter, Mrs. Paul Pierce of Canton, O., and four grandchildren

New Service Offered

A new corporation has been organized to produce machinery, tools and design for the wire industry. The **Micro Metal Products, Inc.,** 3221 N. 31st Street, Milwaukee, Wisconsin, commenced operations on February 1st, 1954, according to **Kenneth P. Lovdahl,** president.

★ ★ ★

Kenneth P. Lovedahl ★ ★ ★ ★ ★ ★

Mr. Lovdahl recently completed the installation of complete wire production facilities at The National Lock Washer Company, Newark, New Jersey, having supervised the design and building of equipment, process, plant layout, advertising and sales.

★ ★ ★

The new company will feature rolling mills, turks heads, lock washer and other special wire forming machinery, as well as accessories, tools and dies.

Made Ass't. General Manager of Rope Company

Appointment of **H. A. Harrington** to the newly created position of assistant general manager, **Leschen Wire Rope division, H. K. Porter Company, Inc.,** St. Louis, has been announced by **D. W. Vernon,** vice president and general manager.

★ ★ ★

Mr. Harrington, who has served the Porter organization in various capacities, will assist in the over-

(ILLUSTRATED)
42" x 20" x 21"—(4000# cap.)

HEAVY DUTY
BREAK-DOWN REELS

1000#
2000#
4000#
} capacities

Rugged Design including patented DURA-CURL rim, and many other features necessary to provide the *Strength* and *Durability* needed for continued successful performance.

Also complete line of sizes of Modern High Speed Wire Drawing NO-CREV Spools and Reels for both fine and intermediate size wire.

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#103

all management of the division. Most recently he was special assistant to Porter's executive vice president. His background includes positions as general manager of Porter's spring division and vice president of Good Roads Machinery Company of New York.

★ ★ ★

Mr. Harrington was graduated from Brown University with a mechanical engineer degree.

Lindberg Forms Canadian Company

Lindberg Engineering Company, Chicago, announces the formation of **EFCO-LINDBERG LTD.,** with headquarters at 544 Inspector Street, Montreal, and branches throughout the Dominion. This company will combine the resources of Lindberg, Electric Furnace Company of England and Williams & Wilson, Ltd. of Canada.

★ ★ ★

F. W. Wilson is President and **A. W. Smith** will be manager.

★ ★ ★

EFCO-LINDBERG LTD. will manufacture a complete line of heat treating and melting furnaces including not only Lindberg's large line of factory built furnaces, but also big steel melting furnaces both arc and high frequency, large brass melting furnaces and field erected furnaces from the EFCO line.

AS&W Man Promoted to Key Sales Position

Maxwell D. Millard, who started his career with **American Steel & Wire Division** in 1934 as a technical apprentice in a wire rope mill at New Haven, Conn., was recently named to a key sales executive position with this United States Steel unit.

★ ★ ★

H. M. Francis, American Steel & Wire's vice president-sales, announced Millard's appointment to the newly created position of assistant general manager of sales. Mr. Millard, who was previously Detroit district manager of sales, will serve as assistant to **John Graham,** general manager of sales at division headquarters in Cleveland.

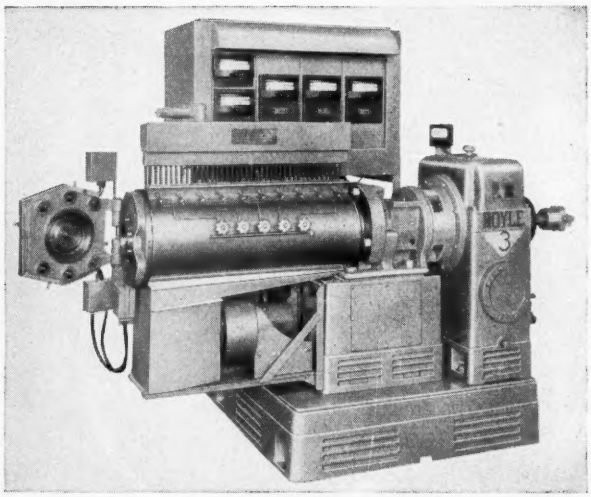
★ ★ ★

A native of Brooklyn, Millard attended elementary schools in Illinois and Lawrenceville Academy in Lawrenceville, New York. He was graduated from Princeton University with a bachelor's degree in philosophy and later received his bachelor's degree and master's degree, both in electrical engineering, from Massachusetts Institute of Technology.

Engineer Joins Whitney Blake

E. Clarke Quackenbush, prominent electrical engineer and specialist on electronic connectors, has joined **Whitney Blake Company,** New Haven, Connecticut, manufacturers of insulated wire and cable and custom-built cord sets. **John Brown Cook,** president of the company, announced that Mr. Quackenbush will serve as manager of a newly formed Electronics Division which will develop, manufacture and sell electronic connectors and assemblies. A native

FASTEST HEATING FASTEST COOLING



Here are some of the time-tested, money-saving reasons more and more plants are standardizing with Royle Spirod* Extruders for processes requiring maximum flexibility in controlled temperatures — constantly maintained and accurately zoned:

- **Extra heavy walled cast steel cylinders that will not warp. No joints to leak when pressures are high or crevices to collect burned compound that would cause contamination.**
- **Heavy duty large diameter heating elements, that can be used with 440 volts without step-down transformers, provide radiant heat to cylinders and heads.**
- **Any heating element may be removed and replaced without disturbing other elements or wiring.**
- **A cooling system with ten times the capacity of conventional designs can be modulated through its entire temperature range without drastic changes. Ample cooling for all compounds at maximum speeds.**

No. 3 Royle Spirod Extruder. Completely insulated and equipped for evaporative cooling.

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PIONEERED THE CONTINUOUS EXTRUSION PROCESS IN

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Home Office — V. M. Hovey J. W. VanRiper SHerwood 2-8262

Akron, Ohio — J. C. Clinefelter SWandale 4-5020

Los Angeles, Cal. — H. M. Royal, Inc. LOgan 3261

PATERSON 3, NEW JERSEY

of Minnesota, Mr. Quackenbush has been continuously associated with the design and development of electric connectors since 1925.

★ ★ ★

Following his career at Pyle-National he spent thirteen years as a member of the engineering staff of **American Phenolic Corporation** in Chicago, working in the field of electrical transmission equipment and electronics. He specialized in communication, transmission and lighting equipment, connectors and wiring devices and the dielectrics used in their design. He holds a number of patents covering connectors and wiring devices and was one of the pioneers in the development of the AN connector line, now in general use in aircraft and many types of electronic equipment.

Norton Adds Two to Sales Staft

Norton Company, Worcester, Mass., has announced two appointments in its sales force effective January 2nd. **Jack M. Esten** has been appointed an Abrasive Engineer and **Robert C. Divoll** has been named a **Field Engineer.** Both are recent graduates of the sales training course.

★ ★ ★

Mr. Esten will be responsible for the territory which includes North Carolina, South Carolina, Virginia, and part of Tennessee. After graduation from Worcester Polytechnic Institute in 1951, he was a foreman in the Wire Mills Division of John A. Roebling's Sons Corporation, Trenton, N. J.

★ ★ ★

Mr. Divoll will assume the duties of Field Engineer working out of the Pittsburgh District Office. He is a 1950 graduate of Clark University and joined Norton Company following Army service.

Alloy Metal Wire Elects Garber Director and Vice President

L. L. Garber, vice president, H. K. Porter Company, Inc., Pittsburgh has been elected a director, vice president and general manager of the **Alloy Metal Wire Company,** Prospect Park, Pa., the newly acquired division of H. K. Porter Company, Inc., according to **T. M. Evans,** president.

★ ★ ★

In his new position with Alloy Metal Wire Company, a leading producer of stainless and alloy wire, rod and strip, Mr. Garber will be in charge of all of the phases of the division's operations.

★ ★ ★

Mr. Garber, formerly general manager of Porter's Hinderliter Tool Company division, has been with the company four years, serving in various management and production capacities. Before joining the Porter organization, Mr. Garber had been with Pittsburgh Screw & Bolt Corporation, Curtiss-Wright Corporation and Tracy Manufacturing Company, where his duties covered production management and industrial relations.

To Manage Machine Division for Torrington

The appointment of **Gustave H. Froelich,** Vice President of **The Torrington Manufacturing Co.,** to the new post of General Manager of the company's Machine Division has been announced by **Andrew Gagarin,** President.

★ ★ ★

Products of the Torrington Manufacturing Co. range from fan blades and blower wheels to spring coiling machines and auxiliary mill machinery such as tube and rod straighteners, slab millers and strip and sheet metal flattening machines.

★ ★ ★

Mr. Froelich, a native of Indianapolis, joined The Torrington Manufacturing Co. in 1943 as Superintendent of its Air Impeller Division after 11 years as Factory Superintendent for Turner & Seymour, also a Torrington concern. He was elected a Torrington Vice President in 1946.

★ ★ ★

Previously he served as Works Manager of the Atlas Tack Corporation and General Superintendent of Henry & Wright in Hartford, Conn., before moving to Torrington with Turner & Seymour.

Announces Sales Engineering Appointments

Two new appointments in the sales engineering staff of **Surface Combustion Corporation** have been announced by **Henry M. Heyn,** Sales Manager of the Heat Treat Division. **Beresford N. Clarke** has been assigned to the Ft. Wayne office and **Hugh W. McIntyre** has been appointed to the Detroit Industrial sales office of the corporation.

Roebling Forms New Department and Shifts Executives

Forest S. Burtch has been appointed product sales manager of the newly formed Construction Materials Department of the **John A. Roebling's Sons Corporation,** a subsidiary of the **Colorado Fuel and Iron Corporation, E. C. Low,** vice president in charge of sales of Roebling's has announced. **Elmer A. Trask** succeeds Mr. Burtch as Wire Rope Sales Manager. Both men are at the Trenton offices.

★ ★ ★

For the past ten years, Mr. Burtch has held several executive sales positions in the Roebling firm. A graduate of Syracuse University, he joined the Roebling Wire Rope Engineering Division staff in 1923 and in 1934 was appointed assistant chief engineer.

★ ★ ★

Mr. Trask was Chicago District Manager for the company from 1950 until this appointment. He has been associated with Roebling's for 29 years, starting as a warehouseman and splicer in San Francisco. In 1931 he became a salesman and in 1936 was made manager of the San Francisco office.

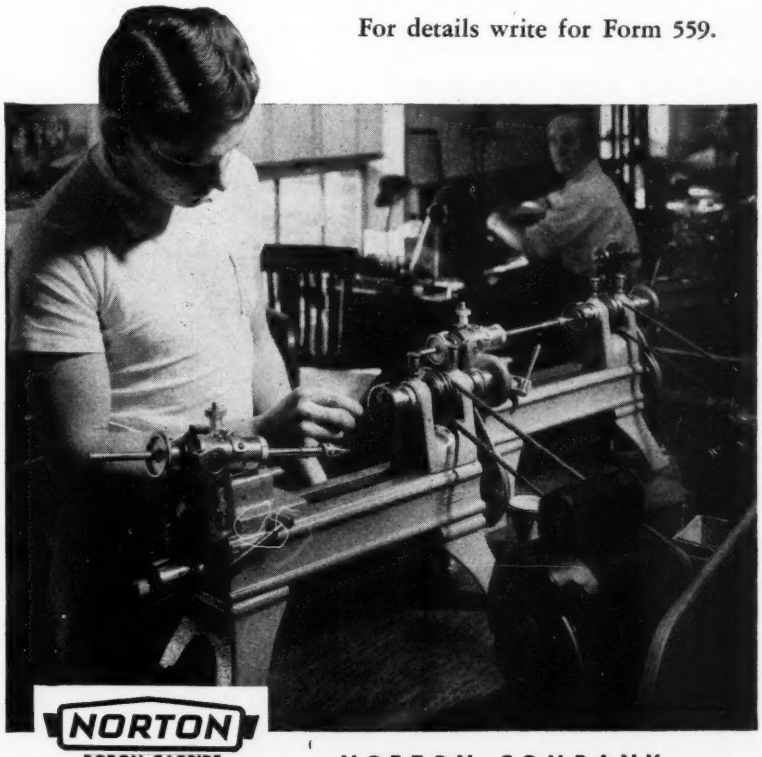
★ ★ ★

Mr. Low stated that creation of the Construction Materials Department makes available, through a single source, the complete Roebling line of wire and stranded steel products for prestressing concrete. Setting up such a depart-

Save Money with NORBIDE® Abrasive . . .

Are you still using costly diamond dust for refinishing your wire drawing dies? Many wire mills are saving money by using NORBIDE Abrasive for ripping or fast stock removal as well as for accurate semi-finishing operations.

For details write for Form 559.



NORTON
BORON CARBIDE

NORTON COMPANY
45 New Bond Street • Worcester 6, Massachusetts

NORBIDE® . . . *the hardest man-made abrasive*

ment was necessitated by the increasing demand for prestressed concrete installations and Roebling's increasing development of products connected with their use.

Heads Commercial Sales of Zirconium for Firth Sterling

T. G. Barnes, Vice President in Charge of Sales at Firth Sterling Inc., has announced that **M. F. Judkins,** New Products Manager, will be in charge of the commercial sales of zirconium and zirconium alloys.

★ ★ ★

The company recently announced its entry into the production of zirconium ingots, billets, bars, rods, wire, sheet and tubing from zirconium sponge. The metal is presently being used as a structural material where nuclear fission is involved. Zirconium will probably be used for this purpose in the power generating industry.

★ ★ ★

Immediate uses for zirconium are in the chemical, pharmaceutical and petroleum industries. More resistant to corrosion than any metal except tantalum, which is very expensive and scarce, zirconium is an excellent engineering material that can be fabricated into useful shapes by conventional methods. It can be melted, cast, forged, rolled or extruded. It is nontoxic and safe to handle at high temperatures. Equally important is the fact that it is the ninth most abundant metal in the Earth's crust. Actual production started sometime in January.

★ ★ ★

J. Mabon Childs will be the project engineer for industrial sales of zirconium.

To Direct Mechanical Maintenance for C.F.&I.

Carl Gustafson has been appointed director of mechanical maintenance for the **Colorado Fuel and Iron Corporation.**

★ ★ ★

Mr. Gustafson will advise on mechanical problems arising in all of CF&I's 14 plants. In addition, he will continue to be superintendent of the mechanical department at the Pueblo, Colorado plant of CF&I.

★ ★ ★

In 1948, Mr. Gustafson was named master mechanic at Pueblo, after serving for five years as assistant master mechanic. He joined CF&I in 1922, working in the machine shop at the Pueblo plant, and was later in the engineering department drafting room and served as general foreman of the machine shop.

New Auto-Lite Purchasing Agent

O. E. Sammelson has been appointed purchasing agent of the Gauge Division of **The Electric Auto-Lite Company** at LaCrosse, Wisconsin, it has been announced by **J. H. Lambrix,** vice president and director of purchasing.

★ ★ ★

THE BEST FOR COVERING...

The ***POURTIER*** *High-Speed*

INDIVIDUAL INSULATING MACHINES

INDIVIDUAL HEAD, handling wire sizes of 7 to 32 A.W.G. Other models made with up to four (4) serving bowls.

POURTIER MACHINES will serve cotton, paper, cambric, fiberglas, silk, nylon and cellulose acetate at speeds of 4500 r.p.m.

EQUIPPED WITH:
9 speed gear box for the haul-off capstan, automatic central lubrication and slow starting mechanism. Speeds easily changed. Bowls with compensator controlling the unrolling of the bobbin and a quick stopping device, in case of breakage of insulating material. Special control to change the direction of the motion of the heads. Traverse motion's speed and displacement easy to set up.

Machines are built to meet AMERICAN STANDARDS

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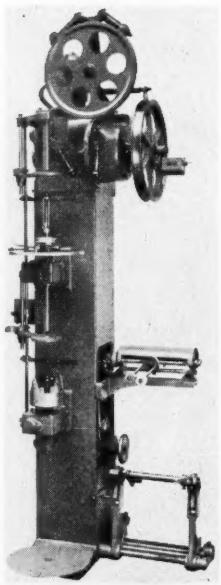

INSULATING MACHINE 1M 402

In making the announcement, Mr. Lambrix also said that **Howard Reese** has been elevated to the post of assistant purchasing agent.

Carpenter Steel Elects Three New Vice Presidents

Three executives of **The Carpenter Steel Company,** Reading, Pa., have been elected vice presidents by the Board of Directors, according to an announcement by **Frank R. Palmer,** company President.

★ ★ ★

In addition to **G. V. Luerssen,** Vice President in charge of Metallurgy, the new vice presidents are **H. Sturgis Potter, Arlington A. Britton, Jr.,** and **John Moxon.** All reside in the Reading area.

★ ★ ★

Mr. Potter, former General Sales Manager, is now Vice President in charge of Sales of the main Reading plant. He joined Carpenter as a sales engineer in the Indianapolis territory in 1936. After five years in the field, Potter was appointed Assistant Manager of Tool Steel Sales in the Reading office. Then he was named Manager of Tool Steel Sales in 1947, Sales Manager in charge of Reading mill products in 1948 and General Sales Manager in 1950.

★ ★ ★

Mr. Britton, previously General Superintendent of the Reading mill, will serve as Vice President in charge of Production. He started with Carpenter in 1933 as an employee in the Inspection Department. Following three years in inspection and five years as a production metallurgist, Mr. Britton became Assistant to the Wire Mill Superintendent. In 1945 he was named Wire Mill Superintendent, then Assistant General Superintendent in 1947 and General Superintendent in 1948.

★ ★ ★

Mr. Moxon, formerly Secretary and Treasurer of the firm, becomes Vice President, Treasurer and Secretary. He has been a member of the Board of Directors since joining Carpenter in 1944. Before that he was Assistant Trust Officer of the Guaranty Trust Company of New York.

Industry Honors Gas Process Pioneer

Frank H. Adams, president of **Surface Combustion Corp.,** Toledo has been given the distinguished service award of the Gas Appliance Manufacturers Association for his achievements as a "pioneer in the development of gas as a tool now employed in more than 26,000 industrial processes."

★ ★ ★

The award was made by the trade group's industrial gas equipment division during the annual meeting of the American Gas Association in St. Louis.

★ ★ ★

The citation named Adams as "one of the first to foresee the potential of gas in industry," and as an "outstanding leader in the development and implementation of gas as a fuel for all types of in-

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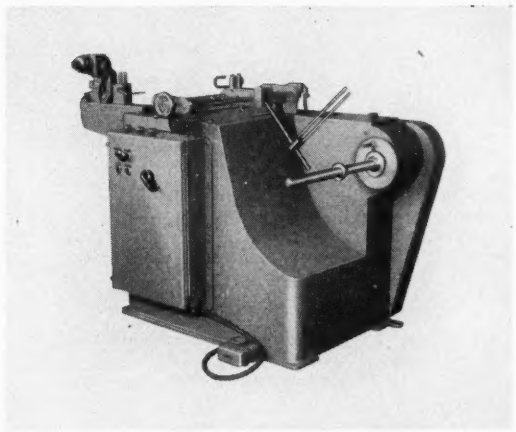
WIM equipment combines practical design and rugged construction in a line of smooth operating wire handling machines. An example is the WIM Model A Respooler. Here is a conservatively engineered and precisely built high speed machine. Operating simplicity is stressed and dependable performance is featured. Write today for further information. Our engineering staff will be glad to help work out your special problems.



WIM MODEL A RESPOOLER

WIRE INSULATING MACHINERY, INC.

Division of Machinery Electrification, Inc.

Worcester Mass., USA

dustrial processing which require precise control."

★ ★ ★

Mr. Adams entered the gas industry in 1922 as treasurer of the Combustion Utilities Corp., a research subsidiary of the Henry L. Doherty Co., and has directed the development of Surface Combustion Corp., the successor company since 1927.

Copper Wire Concern Expands

The Utica Wire Corporation, formerly of Brooklyn, N. Y., moved to larger quarters at 49 Hawkins Street, Derby, Conn., in the summer of 1952 and soon found themselves faced with the need for further expansion to provide for the demands of their customers.

★ ★ ★

The company draws and processes copper wire, specializing in bunched and stranded wire for electric wire uses. Additional stranders and bunchers have been added, as well as an extension of their tinning and annealing facilities placing them in a position to take care of orders for all types and quantities of such wires for electrical conductors.

★ ★ ★

Because they work to very close tolerances and are able to meet rigid specifications, they recently installed their own die room to finish diamond dies to the exact sizes required and to maintain a bank of dies in a proper range of sizes for the exacting tolerances to which they draw the finished wire.

★ ★ ★

The company was organized in 1951 by **Theodore Weiss,** who is manager of the business. **Eugene J. Sheridan is** Director of Sales.

Retires from Continental

W. E. (Earl) Buck, Metallurgical Engineer of **Continental Steel Corporation,** Kokomo, Indiana retired January 1, 1954. Mr. Buck came to Continental from Granite City Steel Company in 1937 and served for many years as Chief Metallurgist of the Sheet Division. He was well known in the steel industry having served on many technical committees for the American Iron and Steel Institute and the American Society for Testing Materials. Mr. Buck's future residence will be in St. Louis, Missouri.

International Paper to Have New Manager for Jersey Plant

Appointment of **T. T. Edwards** as Manager of the Whippany Plant of the Container Division of **International Paper Company,** has been announced by **W. S. Snyder,** General Manager.

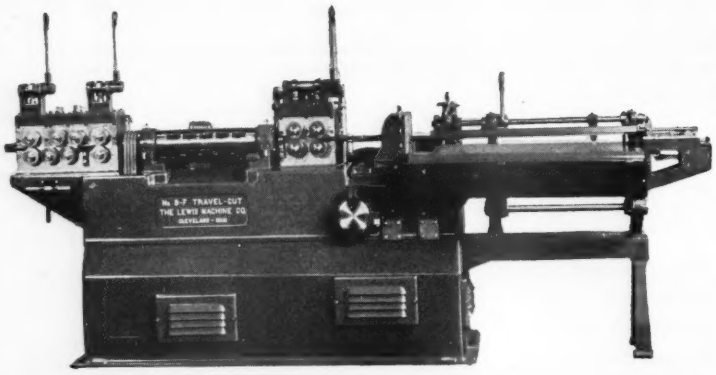
★ ★ ★

Mr. Edwards joined the Container Division in 1945 and served in various capacities at the Chicago and Springhill plants before being appointed Assistant Manager of the Whippany plant in 1948. He is assuming duties formerly handled by R. D. Maffitt who has resigned effective December 1st, 1953.

Fast, Accurate, Economical

STRAIGHTENING and CUTTING

with LEWIS TRAVEL-CUT



22 Models to handle from .012" to ¾" Round, Hex, Flat, Shapes.

Simple in design, rigid in construction, Lewis TRAVEL-CUT will deliver continuous dependable service under the most severe, high production conditions—day in, day out. Feeds wire from the coil, straightens accurately, gauges to uniform length, and cuts clean without stopping the wire. For steel, brass, aluminum and alloy wire. Cut your cutting costs with the Lewis TRAVEL CUT. Full details on request.

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A Review of Recent Wire Patents

No. 2,664,609, ARTICLE HOLDING DEVICE, patented January 5, 1954 by Edgar E. Kellems, Pasadena, Calif., assignor to Kellems Company, Stonington, Conn., a partnership.

This device is an open meshed wire structure for holding cord, rope and the like.

★ ★ ★

No. 2,664,778, SELF-CLENCHING NAIL, patented January 5, 1954 by Emanuel Gisondi, New York, N. Y.

The shank of this nail comprises two overlying legs, one shorter than the other and connected together near the head of the shorter leg by a strip which constitutes a buckling element to form a locking member when the longer leg is driven for its full length through material after the shorter leg has completed its driving movement therethrough.

★ ★ ★

No. 2,664,899, DOUBLE BOBBY PIN, patented January 5, 1954 by Isidor Attias, Long Beach, N. Y.

In this pin two outer corrugated sections are disposed at both sides of a central smooth-surfaced section.

★ ★ ★

No. 2,665,147, WIRE DISTRIBUTING FLOOR STRUCTURE, patented January 5, 1954 by Joseph William Wiesmann, Pittsburgh, Pa., assignor to H. H. Robertson Company, Pittsburgh, Pa., a corporation of Pennsylvania.

A hollow J-shaped fitting is provided for disposition with the straight end extending upwardly from the floor and the curved end below the floor.

★ ★ ★

No. 2,666,093, LOW LOSS HIGH-FREQUENCY TRANSMISSION LINE, patented January 12, 1954 by Leslie K. Wildberg, Shaker Heights, Ohio, assignor to Radix Wire Company, Cleveland, Ohio, a corporation of Ohio.

A band or ribbon of dielectric material has formed integral therewith tubular side marginal portions containing the conductor wires.

★ ★ ★

No. 2,666,282, METHOD OF CONDITIONING METAL SHEETS, STRIPS, RODS, AND THE LIKE, patented January 19, 1954 by Ruben O. Peterson, University Heights, Ohio, assignor to The Osborn Manufacturing Company, Cleveland, Ohio, a corporation of Ohio.

More specifically, the method is for removing scale from strips and comprises flexing the sheet, brushing the convex face of the latter, and simultaneously supplying to the face thus being brushed an abrasive consisting entirely of previously removed scale particles.

★ ★ ★

No. 2,666,471, TRACTION CHAIN, patented January 19, 1954 by Sherman L. Richards, North Tonawanda, and William H. Devonshire, Kenmore, N. Y., assignors to Columbus McKinnon Chain Corporation, Tonawanda, N. Y.

This heavy wire chain for tires includes a taut cross chain and a slack cross chain disposed in side-by-side relation and each extending the entire distance between side chains, the slack cross chains being of a greater lengthwise extent, than the taut cross chains sufficient to enable the slack cross chain of each unit to roll freely back and forth across its associated taut cross chain as the wheel mounting the traction device rotates.

★ ★ ★

No. 2,666,477, ZIGZAG SPRING SEAT BACK HAVING ALTERNATE SPRINGS OF DIFFERENT LENGTHS AND FORM, patented January 19, 1954 by Hyland C. Flint, Birmingham, Mich., assignor to Americal Metal Products Company, Detroit, Mich., a corporation of Michigan.

Sinuous wire springs form major portions of the seat back.

★ ★ ★

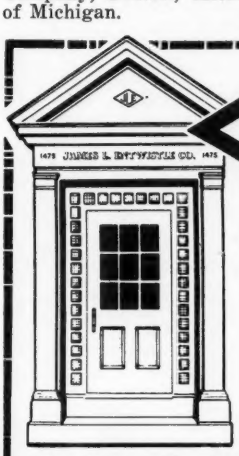
No. 2,666,636, VEHICLE SPRING SUSPENSION, patented January 19, 1954 by Cal W. Wulff, Chicago, Ill., assignor to Holland Company, a corporation of Illinois.

The springs are arranged in parallel to support a given load, one spring having a constant load-deflection rate, and another having a variable load-deflection rate, the composite rates of the springs being on a curve defined by the formula

$$f = K \text{ Loge } \frac{W}{1000} + C$$

in which

f = deflection



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- Wire Guide Units
- Pay-off Reels Stands
- Electronic Devices
- Shaftless Take-ups and Payoffs
- Wire Pre-Heater
- Disk Brakes and Controls, Drag Units and Slip Clutches
- Wire Marking Machines, Type Strips, Inks
- Labelling Machines
- Pneumatic Equipment and Controls
- Special Machinery for the Wire Industry
- Hydraulic Equipment and Controls
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See Page 260 for News of JLE Automatic Dual Take-Up Machine

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European & South American Agents: M. CASTELLVI, INC., 150 BROADWAY, NEW YORK 38, NEW YORK

British Associate: GENERAL ENGINEERING CO., LTD., BURY ROAD, RADCLIFFE, LANCS., ENGLAND

Asiatic Agent: OKURA & COMPANY, 30 CHURCH ST., NEW YORK 7, NEW YORK

K = the constant effective static deflection
W = the load in thousand pounds
C = the constant of interation
Log_e = Napierian logarithms in which the base is 2.718281828.

★ ★ ★

No. 2,666,723, METHOD OF MANUFACTURING HELICAL COIL COMPRESSION SPRINGS, patented January 19, 1954 by Elliott W. Stewart, Chicago, Ill., assignor to Associated Spring Corporation, Bristol, Conn., a corporation of Delaware.

The method is disclosed of manufacturing, from spring wire formed of a steel having a critical range and capable of being formed into a spring which will be reduced in length by the application of pressure and at least certain degrees of heat, which temperature is below the critical range of the spring wire.

★ ★ ★

No. 2,667,319, COMBINED CRATE AND PALLET STRUCTURE, patented January 26, 1954 by Burton C. Coit, Jr., Pittsburgh, Pa., assignor to Tri-State Engineering Company, Washington, Pa., a corporation of Maryland.

This structure comprises a lattice-like deck sheet of an upper series of laterally-spaced rods welded crosswise of a lower series of laterally-spaced rods with a supporting frame for the deck.

★ ★ ★

No. 2,667,335, FOLDABLE FENCE, patented January 26, 1954 by Frederic Martin Lewis, Belleville, Ontario, Canada, assignor to Jules Samon, Watertown, N. Y.

A foldable wire fense is disclosed comprising a number of U-shaped sections, each having its legs arranged horizontally one above the other and connected by an integral upright member, the outer ends of the legs of the sections having bends to form loops, the loops of one section extending about the upright member of an adjacent section, and upright brace members secured to said legs intermediate of the ends thereof for supporting the legs in parallel relation to each other.

★ ★ ★

No. 2,667,429, COATING MIXTURE WITH ADDITION AGENT AND METHOD OF COATING THEREWITH, patented January 26, 1954 by John B. Diffenderfer, North Caldwell, N. J., assignor to Radio Corporation of America, a corporation of Delaware.

A method is covered in this patent for mechanically coating an iron base with an alloy of copper and nickel.

★ ★ ★

No. 2,667,433, PROCESS FOR THE DIFFUSION-SUBSTITUTION COATING OF METAL ARTICLES FROM A TIN SALT MELT, patented January 26, 1954 by Erich Gebhardt, Ludwigsburg, and Gerhard Schrag, Goppingen, Germany, assignors to Meinecke Metallurgie G. m. b. H., Hannover, Germany.

Here a method is disclosed for tin coating iron articles by immersing them directly in a molten bath consisting of at least 60 per cent $KCl.SnCl_2$, the rest of the bath being composed of a substance selected from the group consisting of alkali metal, earth alkali metal and zinc halides, and maintaining said bath at a temperature of between 300-500°C.

★ ★ ★

No. 2,667,453, METHOD OF ELECTROPLATING COPPER ON METAL ARTICLES, patented January 26, 1954 by Guy E. Murray, Towson, Md., assignor to Western Electric Company, Incorporated, New York, N. Y., a corporation of New York.

More specifically the method is adapted for electroplating copper on wire. There are eleven claims.

★ ★ ★

No. 2,667,557, WIRE SEVERING APPARATUS, patented January 26, 1954 by Carl Herzog, Belleville, N. J., assignor to Western Electric Company, Incorporated, New York, N. Y., a corporation of New York.

This is apparatus for severing closely positioned wires bonded together by beads at regularly spaced intervals to produce a continuous string of beads each having lead wires extending in opposite directions from the bead.

★ ★ ★

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Wire Netting Machines for Chain Link, Hexagonal Mesh, Poultry Netting, Field Fence. Crimping, Barb Wire and Staple Machines. Spring Coilers. Spring End Grinding Automatics. Loop Benders. Upholstery Spring and Wire Mattress Machines. Wire Nail Machinery. Chain Formers. Chain Welders. Straightening and Cutting Machines. Multi-Slide Wire and Strip Forming Machines. Special Machinery for the making of Paper Clips, Lock Washers, Bale Ties, Key Rings, Tin Openers, Wire Bag Ties, etc. Automatics for Flexible Metallic Tubing.

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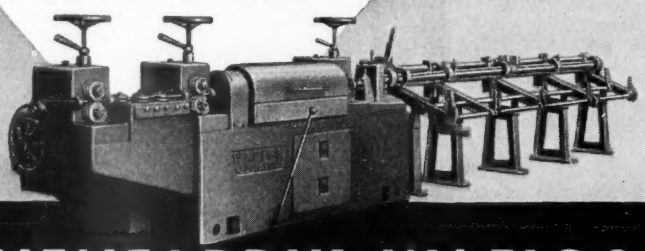

MASCHINENFABRIK WAFIOS

WAGNER, FICKER & SCHMID REUTLINGEN 3 / WURTT. GERMANY

Standards Affecting the Wire Industry Formulated by ASTM in 1953

Iron-Chromium, Iron-Chromium-Nickel and Related Alloys

After several years in preparation, Committee A-10 completed and presented to the Society through the Administrative Committee on Standards the Tentative Specifications for Iron-Chromium and Iron-Chromium-Nickel Alloy Tubular Centrifugal Castings for General Applications (A 362). The Society at the Annual Meeting accepted the Tentative Specifications for Stainless Steel Wire Strand (A 368), this specification covering stainless steel strand suitable for use as guy wires, overhead wires, and similar purposes.

Wires for Electrical Conductors

The Tentative Specifications for Soft or Annealed Copper Wire (B 3 - 53 T) now include sampling procedures based on statistical analysis of data collected for this purpose. Both Specifications B 3 and Specification B 1 for Hard-Drawn Copper Wire contain this new approach to sampling.

★ ★ ★

After several years of development, the Tentative Method for Determination of Cross-Sectional Area of Stranded Conductors (B 263-53T) has been published, covering the weight method.

★ ★ ★

For many years there has been need for industry standardization on stiffness requirements for soft copper wire, particulary as applied to magnet wire, as evidenced by the development of many special test methods by individual users (Morehouse, RCA, Belden, LSE, Rockwell Superficial, etc.). The committee has considered this problem over.

Electrical Insulating Materials

Committee D-9 completed an important revision in the Specifications for Natural Muscovite Mica Based on Visual Quality (D 351). These revisions largely resulted from participation of the committee in the work of the International Committee ISO TC/56 on Mica. In order to clarify the verbal descriptions of visual quality of natural muscovite mica, a set of Master Standards of Waviness, representing the full range of wave variations for visual quality levels of Good Stained and better has been selected. This Master Set of Standards for Waviness will be available for inspection at ASTM Headquarters in Philadelphia. Another important revision was the addition of a new classification V-11 for densely stained mica.

A new Tentative Method of Test for Corrosive Sulfur in Electrical Insulating Oils (D 1275) was issued as tentative. A number of statements on definition and significance for various tests used in the analysis of askarels were completed and added to Methods D 901. Also the Methods of Testing Untreated Paper Used for Electrical Insulation (D 202) were revised to include statements on significance of test for tensile strength, tear strength, ash, and dielectric strength. Important changes were made in the Tentative Methods of Testing Pressure-

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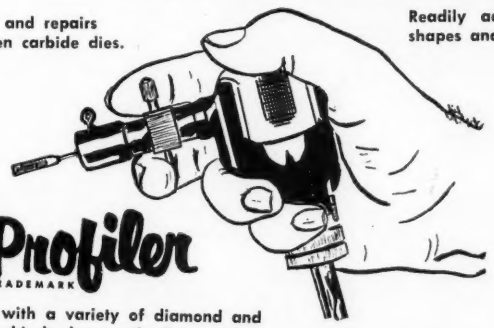
Makes and repairs tungsten carbide dies.

Readily adapts to special shapes and contours.



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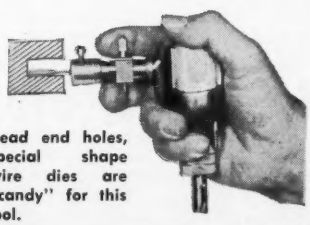

Dead end holes, special shape wire dies are "candy" for this tool.

Nord International Corp.

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Sensitive Adhesive Tapes Used for Electrical Insulation (D 1000). These methods are under further study and will be revised again during the coming year.

★ ★ ★

Committee D-9 has completed two additional projects which will be submitted to the Society through the Administrative Committee on Standards and published early in 1954. The first comprises an extensive revision of the comprehensive Methods of Test for AC Capacitance, Dielectric Constant, and Loss Characteristics of Electrical Insulating Materials (D 150). These revised methods have been under study for several years. Final agreement on the new test procedures has been reached and approved by letter ballot of the committee. The second item covers Specifications for Electrical Insulating Paper of the Interlayer Type used in coils, transformers, and similar electrical apparatus. A Proposed Method of Test for Dielectric Constant Dissipation Factor of Aviation Fuels has also been completed and will be submitted for publication as information.

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Instruments to Play Key Role in Steel Future

Sales to the steel industry of recording, controlling and measuring instruments will remain steady during 1954 even though that industry is in the latter stages of the largest expansion program in its history, an industry expert, **John R. Green,** declared recently. Mr. Green, steel industry manager for the Industrial Division of **Minneapolis-Honeywell Regulator Company,** pointed out that instrument sales have increased some 10 times in the industry's big modernization and investment programs. This expansion program, stimulated by high demand and accelerated amortization certificates, will have cost the steel industry some $5.5 billion in new facilities that will have upped its capacity to some 120 million tons annually —or approximately five times the capacity 50 years ago.

★ ★ ★

Looking ahead, Mr. Green saw a continuing dependence upon such modern equipment aids as automatic control devices to prevent technological obsolescence in existing facilities and to obtain greater efficiency in utilization of by-product fuels. He also predicted that instruments would play an important role in the processing of such low-grade ores as taconite as the industry switches from the pilot-plant stage into volume production.

★ ★ ★

Green saw the nation's growing need for uranium as stimulating additional application of industrial instruments. He explained that in one uranium mill the use of such instruments improved the control of uranium processing to the extent that the mill saved $5,000 per month.

New Alumina Plant Gives Texas Its First Completely Integrated Aluminum Facility

The LaQuinta alumina plant of **Reynolds Reduction Company,** a wholly owned subsidiary of **Reynolds Metals Company,** is now substantially completed and is being operated by the latter company, it

is announced by **J. Louis Reynolds**, vice-president in charge of operations, Richmond, Virginia. Located on the north shore of Corpus Christi Bay in south Texas, the plant has a rated output of 1000 tons of alumina daily.

★ ★ ★

LaQuinta is designed especially to process Jamaica bauxite. Oceangoing vessels bring the bauxite up a 6½-mile channel 32 feet deep across Corpus Christi Bay to a new pier constructed on the waterfront side of the plant site.

New Farrel Rolling Mill Catalog

A new 36-page bulletin which describes and illustrates Farrel rolling mills, gear drives, pinion stands and rolling mill handling equipment is now available on request. Included in the booklet are pictures of more than thirty sizes and types of mills for nonferrous rod, strip or sheet, metal foil and cold strip steel, plus illustrations of related equipment, all informatively captioned. Write Farrel-Birmingham Company, Inc., Ansonia, Conn.

Electric Wire Company Expands

Electric Wire Company, Northampton, Mass., recently completed an expansion project. They have added 6000 square feet of space, all devoted to annealing and respooling operations, so that they now have 10 annealing furnaces and 10 respooling machines. New drawing equipment will shortly be added that will enable them to furnish wire from .250″ to .001″ in diameter.

★ ★ ★

While producers of copper wire, the company also draws stainless steel, monel, phosphor bronze and brass wire. It is because of a substantial increase in new business in these other wires, that the company had to increase its facilities. An official states that its processing techniques have been so improved with respect to stainless steel, that they can get three times as much stainless wire production from a diamond die as they can in drawing brass.

★ ★ ★

The company specializes in fine wires drawn, not to within allowable tolerances, but to exact on-size specifications. The whole business has been built around the idea of high quality, uniformity and adherence rigidly to specifications.

★ ★ ★

The company was started five years ago with 6 machines and 2 men. It has expanded every year and is now turning out 14 times as much wire as it did in 1948.

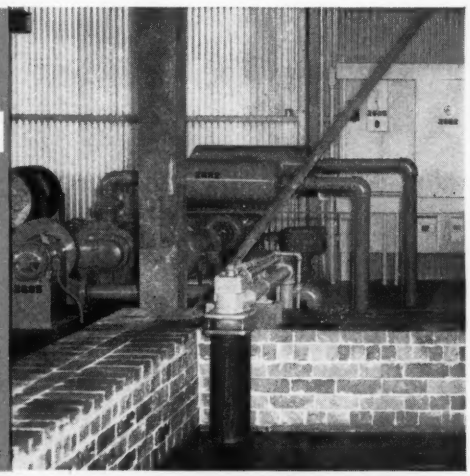
Standard Comparison Slides for Checking Diamond Grade and Purity

A newly developed set of Master Comparison Slides for use in microscopic inspection of diamond abrasives is being offered by the Abrasives Division of **Elgin National Watch Company** to help diamond users make a quick, accurate check of diamond particles for grading and degree of purity.

★ ★ ★

Are You PAYING TOO MUCH to Pickle Metal?

In Submerged Combustion pickling installations there is no heat loss from radiation and no heat transfer surface to corrode.



Here are three major cost factors facing any plant engaged in metal pickling.

LABOR | FUEL | ACID

The cost to you of each of these factors is determined largely by the method used in pickling. One large company found that they saved 41% of labor costs, 47% of acid costs after Submerged Combustion equipment was installed. Although fuel savings as high as 95% have been reported, an average saving in fuel is estimated at 60%.

These savings are only part of the story. Submerged Combustion equipment is also the most effective method of defeating corrosion. There is simply no heat transfer surface to corrode. In addition, this method concentrates, rather than dilutes, the solution.

GET THE FACTS FOR YOURSELF

Find out what Submerged Combustion equipment offers in improved production and lower costs. Write for further details today.

Submerged Combustion COMPANY OF AMERICA, INC.

753 LOGAN STREET HAMMOND, INDIANA

A QUARTER-CENTURY OF SERVICE TO INDUSTRY

The slides, when used with a microscope, will permit examination of diamond particles in grades ranging from 1 micron to 100 mesh through comparison of the diamond powder or compound with the diamond on the master slide. The determination of impurities may also be made microscopically with the aid of a polarizing attachment.

★ ★ ★

A printed table is provided with the box of gages which shows the recommended Bureau of Standards grade numbers, the particle size range of each grade, and a rough comparison with the old powder numbering system.

★ ★ ★

Complete information and prices on the new Elgin Master Comparison Gages may be obtained on request to Elgin National Watch Company, Abrasives Division, Elgin, Illinois.

Anaconda's Magnet Wire Container Proves Its Worth

After two years of constant service, in use between its customers and its Muskegon Mill, where most of its magnet wire products are produced, **Anaconda Wire & Cable Company** is convinced that its investment in research and development of its award winning molded fibre magnet wire container has paid off. In the two-year period since the first six-inch containers were introduced, only 179 cases out of more than 30,000 put into use have had to be scrapped.

★ ★ ★

Some cases have made as many as nine round-trips between the Michigan Mill and its customers, and they are still in use.

★ ★ ★

With the new container, the fact that it is made of mating halves frequently has meant one undamaged half can be salvaged for later mating with another standard half.

★ ★ ★

The new molded fibre container was the result of long months of research. Almost at once its many advantages won its acceptance by the trade. They included: (a) damage to wire virtually eliminated, (b) the case weighed one-third as much as the wooden cases replaced, (c) it conformed to carrier requirements and commodity classifications more closely than the old wood case, (d) it required no interior or extra packing, (e) magnet wire spools were easier to pack and unpack, (f) when empty, the case halves nested within each other in storage space one-third that required for wooden cases, (g) the cases were returnable and reusable, (h) lighter tare weight meant a sizable reduction in freight costs, and finally, (i) since tare weight was uniform, it is now possible to bulk-weigh magnet wire.

Nichols Wire & Aluminum Completes Expansion Program

Completion of a three-year program of expansion and regional organization in production, warehousing and sales has led to the election of **Lloyd E. Batten** and **Edward C. Manix** as vice presidents of **Nichols Wire & Aluminum Company**, it was announced recently.

★ ★ ★

WIRE SPOOLS, ALL-STEEL, LITHOGRAPHED

Ends and traverses may be shipped separately and assembled easily in your plant on a hand, foot, or power press.
5" and 6½" diameter ends with 1-15/16" diameter traverses.
10½" diameter ends with 3½" diameter traverses.
Traverse lengths up to 12".

J. L. CLARK MANUFACTURING CO.
600 23rd AVENUE • ROCKFORD, ILLINOIS

Unsurpassed-anywhere!

IT ALL COMES DOWN to one fact... that you can always count on Roebling high carbon flat spring steel to reduce preparation time, machine stoppages and rejects to a minimum. What's more, it's made as you want it... annealed, hard rolled untempered; scaleless tempered; tempered and polished, blued or strawed.

You *pay* for the best every time you buy flat spring steel. Make sure you *get* it. Specify Roebling. John A. Roebling's Sons Corporation, Trenton 2, N. J.

ROEBLING CF&I

A subsidiary of The Colorado Fuel and Iron Corporation

California giant Sequoias—largest of all trees.

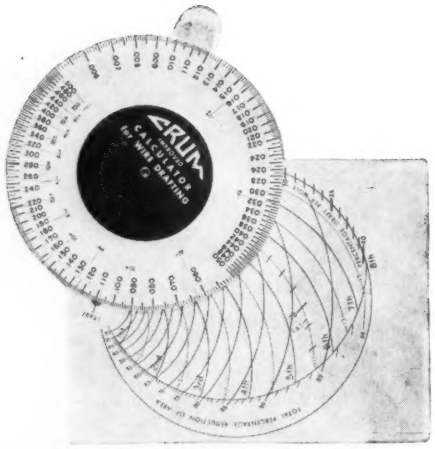
BRANCHES: ATLANTA, 934 AVON AVE. • BOSTON, 51 SLEEPER ST. • CHICAGO, 5525 W. ROOSEVELT RD. • CINCINNATI, 3253 FREDONIA AVE. • CLEVELAND, 13225 LAKEWOOD HEIGHTS BLVD. • DENVER, 4801 JACKSON ST. • DETROIT, 915 FISHER BLDG. • HOUSTON, 6216 NAVIGATION BLVD. • LOS ANGELES, 5340 E. HARBOR ST. NEW YORK, 19 RECTOR ST. • ODESSA, TEXAS, 1920 E. 2ND ST. • PHILADELPHIA, 230 VINE ST. • SAN FRANCISCO, 1740 17TH ST. • SEATTLE, 900 1ST AVE. S. • TULSA, 321 N. CHEYENNE ST. • EXPORT SALES OFFICE, TRENTON 2, N. J.

PHOTO BY HC MANUS

THE NEW and IMPROVED . . .

CRUM CALCULATOR

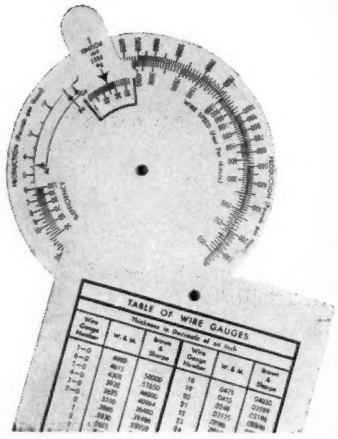
FOR WIRE DRAFTING



Front view of Crum Calculator.

THIS NEW DOUBLE-PURPOSE CALCULATOR WILL:

1. Provide quicker and more accurate information on die sizes and reduction areas;
2. Calculate wire production rates for various speeds and efficiencies.



Reverse view of Crum Calculator.

SOME OTHER FEATURES OF THE CALCULATOR

- Has new scale for more accurate determination of small percentages.
- Gives readings in B & S gauges.
- Intermediate lines provide reductions for 16 holes in one setting.
- New rectangular shaped back for better protection of calculator.
- More legible % draft-per-hole scale.
- Vinyl plastic construction, resistant to wear, warping, dirt, perspiration, wire drawing soaps—can be cleaned.
- Still fits your vest pocket.
- Handy tables of W & M and B & S gauges.
- Feet per pound calculating scale for steel, copper and aluminum wires.
- Durable, accurate, easy to use.

The improved Crum Calculator is worth its weight in gold in time saving —no laborious mathematical calculations necessary when you use it. Instruction sheet with examples accompany each Calculator. You should have one or more in your wire drawing department.

THE PRICE: $5.00 EACH

Send your orders to:

WIRE AND WIRE PRODUCTS

453 MAIN STREET **STAMFORD, CONN.**

(Exclusive distributors)

Frank R. Nichols, president of the aluminum products firm, said that both men would remain in their previous assignments, Mr. Batten as director of purchasing, and Mr. Manix as general sales manager.

★ ★ ★

"Election of Messrs. Batten and Manix as officers of the company, marks the completion of a major expansion and reorganization program," Mr. Nichols said. "The company now has warehouses in Seattle, Oakland, Mason City and Battle Creek; district offices in Atlanta and Cincinnati, and a new warehouse and fabrication facility at Danbury, Conn. The sales force has been regionalized and increased by 300%."

★ ★ ★

Mr. Batten, who is United States aluminum representative, Non-Ferrous Metals Committee, National Association of Purchasing Agents, has been associated with the Nichols company for 29 years. Mr. Manix became general sales manager of Nichols in 1950, after having served as treasurer of the Arms Manufacturing Company, president of Armsworth Sales Company, both of South Deerfield, Mass., and New England sales representative for Nichols.

Makes Initial Nickel Shipment Under U. S. Contract

From its vast Port Colborne refinery, **The International Nickel Company of Canada, Limited,** has recently made the first shipment of metallic nickel under a contract calling for quick delivery of 120,000,000 pounds of the metal to the United States Government over a five-year period ending in 1958, according to **J. Roy Gordon,** Vice-President and General Manager of Canadian Operations. Deliveries will be made at a monthly rate of 2,000,000 pounds until the contract is completed.

★ ★ ★

With an additional output of 24,000,000 pounds annually, International Nickel's rate of nickel production is now approximately 275,000,000 pounds per year.

★ ★ ★

When signing of the contract with the Defense Materials Procurement Agency of the U. S. Government was announced on June 1, 1953, **Edmund F. Mansure,** then Administrator of the Agency, noted that "from the standpoint of the quantities (of nickel) firmly committed and the rate of delivery of the Inco contract is by far the largest of those signed" by the Government.

New Book on Stress Concentration Design Factors

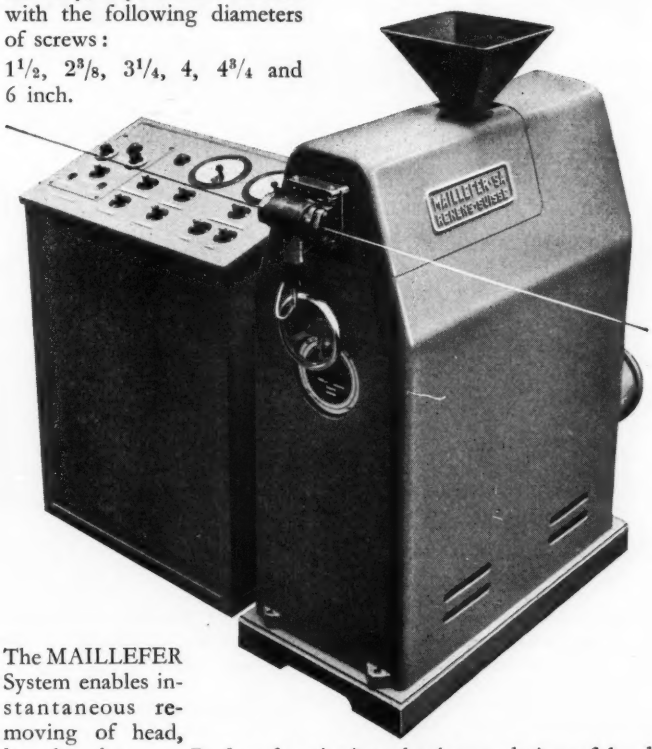
"Stress Concentration Design Factors" by **R. E. Peterson,** nationally known authority on the mechanics of materials, has just been published by John Wiley & Sons, New York. The book consists of charts and relations useful in making strength calculations for machine parts and structural elements. Price of the book is $8.50.

★ ★ ★

The author is Manager of the Mechanics Department, Research Laboratories, **Westinghouse Electric Corporation,** East Pittsburgh, Pa. He has achieved a nation-wide reputation as an outstanding diag-

EXTRUDERS

Specially designed for the Wire Industry, they are manufactured with the following diameters of screws:
1 1/2, 2 3/8, 3 1/4, 4, 4 3/4 and 6 inch.



The MAILLEFER System enables instantaneous removing of head, barrel and screw. Perfect functioning thanks to design of head, barrel and screw. Fully electrically heated, with precision instruments. No worm gears. Specially designed for PVC, Polyethylene or Nylon.

MAILLEFER S.A.

RENENS-LAUSANNE (SWITZERLAND)

MACHINERY FOR THE WIRE INDUSTRY

For the U.S.A. enquire to: J. L. Entwistle Company, Providence, R. I.

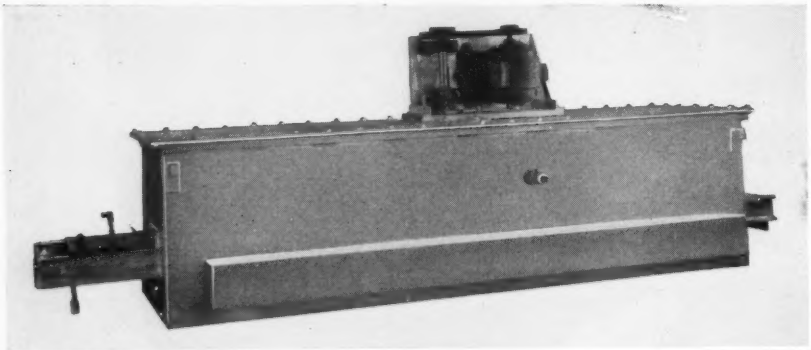
nostician of mechanical breakage.

★ ★ ★

A working tool for designers, the 150-page book is concerned with the improvement of design calculations that will result in better-balanced plans and ultimately reduce operating failure. Amplifying his graphic presentation with succinct explanatory notes, the author covers definition and design relations, grooves and notches, shoulder fillets, holes in plates or shafts, and miscellaneous design elements. ★ ★ ★

A clear thumb-index, the wire-ring binding, and 8 x 10 in. full-grid charts are the prominent features that carry out the book's functional nature. Appendices provide information on stress relations for member with single groove or notch, application of Mohr theory for fatigue of brittle materials, derivation of relation for limited number of cycles, and derivation of combined stress relations.

ROCKWELL BUILDS
Complete Processing Equipment for Magnet Wire
ENAMELING • TINNING
GLASS COATING • SYNTHETIC COATINGS



Rockwell continuous, recirculating oven for annealing 16 lines of wire in protective atmosphere. Part of a complete wire enameling installation. Can be used for copper, brass and steel wire at temperatures to 1200°F.

Also continuous annealing or hardening lines for all types of ferrous and non-ferrous wires.

We Invite Your Inquiries

We are pleased to announce that the wire processing equipment division is under the direction of Mr. O. S. Haskell.

W. S. ROCKWELL COMPANY

FURNACES • OVENS • BURNERS • VALVES • SPECIAL MACHINERY

2424 ELIOT STREET • FAIRFIELD, CONN.

Sales Representatives in Principal Cities

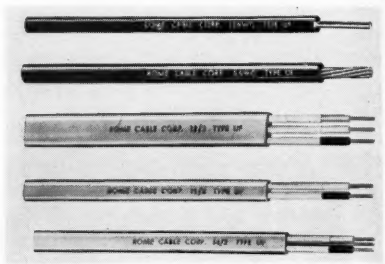
New Multi-Purpose Electrical Cable Announced by Rome Cable

A new low-cost, versatile cable for branch and feeder circuits on farms, in industry, and in homes, is announced by the **Rome Cable Corporation,** of Rome, New York.

★ ★ ★

This new cable, known as Rome FlexAll, is designed especially for underground feeder service, and for installation in locations where dampness or corrosive action are encountered. It is available in single, two and three conductor constructions, that are aproved by Underwriters' Laboratories, Inc. and recognized by the National Electrical Code, 1953.

★ ★ ★



Various constructions of the new Rome FlexAll multi-purpose cable are shown in this composite photo. Starting at the top, the constructions are: Single conductor solid; single conductor stranded; three conductor; two conductor, and two conductor with ground wire.

The single conductor is approved as Type UF and the two and three conductor constructions are approved as both Type UF and Type NMC. Thus, these cables are suitable for branch or feeder circuits buried directly in earth, when provided with suitable overcurrent protection. In addition, multiple conductor FlexAll also is suitable for interior wiring, either exposed or concealed, in wet or corrosive locations, and for installation in hollow spaces of masonry block or tile walls, or embedded in plaster or shallow chase in masonry, when suitably protected.

★ ★ ★

Additional information on the new cable may be obtained by writing to the Rome Cable Corporation, Rome, New York. Ask for Bulletin **RF-1.**

Introduces Portable, Visual Unit for Testing Special Atmospheres

The Electric Furnace Co., Salem, Ohio, manufacturers of gas-fired, oil-fired and electric heat treating furnaces, has just introduced a new portable, visual unit, for testing gases, that is reported to have valuable applications in both research and production departments of any plant using special atmospheres or heat treating furnaces.

★ ★ ★

With this unit the operator can determine, quickly and easily, the quality of gas being produced by a special atmosphere generator, also the quality of the atmosphere in special atmosphere heat processing furnaces.

★ ★ ★

For example: When carburizing or doing other heat processing of high carbon steel, the unit will determine the carbon potential of the atmosphere produced by the generator or present in the furnace.

★ ★ ★

It is also used to detect the presence of sulphur, which usually is detrimental to bright annealing treatments, and may come from such sources as the fuel gas used in producing the atmosphere; the rolling oil used in producing the material being annealed; or even from the furnace lining or from various other sources.

★ ★ ★

The testing equipment is completely housed in a sturdy, metal case approximately 22″ long, 9″ wide and 9″ high. The case is finished in attractive gray crackle enamel—can be locked shut to prevent tampering—and has a comfortable handle in the top for convenience in carrying from place to place. The weight of the complete unit is approximately 35 lbs.

Cartridge Nib Line Announced

A standard line of unground cartridge case die nibs is announced by **Carboloy Department of General Electric Company,** Detroit. Four hole diameters are offered. These range from 0.290 to 0.780, designated CNA-7, 15, 23 and 37, stocked in grade 779 Carboloy cemented carbide.

Westhaver Moved to San Francisco by Columbia

Loren J. Westhaver, vice-president and manager of Utah operations for **Columbia-Geneva Steel Division,** U. S. Steel Corp., has been moved to the division's San Francisco headquarters as general manager of operations, a new executive position in the operating department headed by **L. S. Dahl,** vice president.

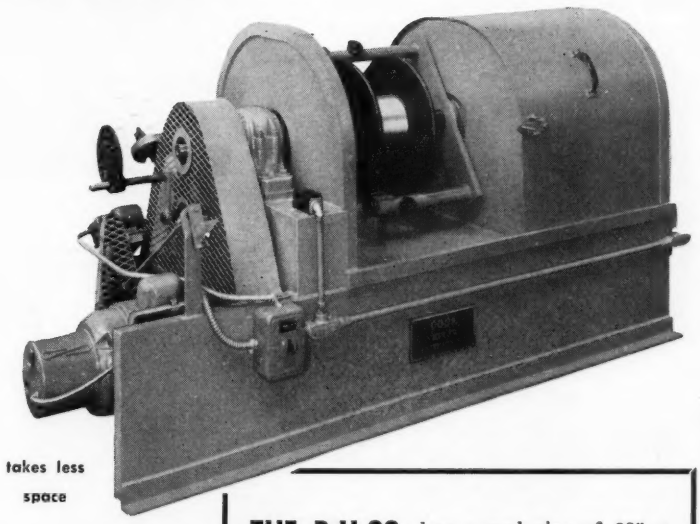
Bulletin Gives Carboloy District Offices

The Carboloy Department of General Electric Company, Detroit 32, Mich., has issued a bulletin announcing three new district offices in Boston, Pittsburgh and St. Louis.

★ ★ ★

In addition the bulletin gives the names, addresses and personnel of all branches and a complete listing of their authorized distri-

A COOK BUNCHER
is versatile—



takes less space

THE B-H-22 has a reel size of 22″ x 11″ and a capacity of 500 lbs. and, like all Cook Bunchers, has successfully formed bunched strands of 7, 10, 16, 19, 26, 41 and 65 wires with such concentricity as to enable its passage through an extruding die of only 1 mil clearance. In addition, such constructions as 27/36 and 41/36 have been bunched, at high speed, with perfect concentricity on this versatile machine.

- **HIGH SPEED**
- **SINGLE TWIST FLYER**
- **ELECTRONIC LAY CONTROL**
- **LARGE TAKE-UP REEL**

Write today, for descriptive literature giving details of construction and performance

COOK MANUFACTURING COMPANY
50 East 25th Street, Paterson, N. J.

butors throughout the United States.

★ ★ ★

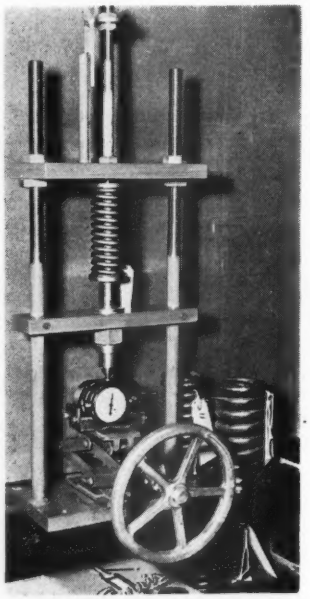
Every user or potential user of Carboloy products will find this bulletin helpful and you are invited to send for a copy for your files.

Method of Calibrating Load and Deflection Conditions of Helical Compression Springs

An inexpensive and simple way of testing compression coil springs has been developed by the **Farris Engineering Corporation** of Palisades Park, New Jersey, manufacturers of precision safety and relief valves.

★ ★ ★

The illustration shows this new method of operation, a description of which is as follows: First, a Dillon Mechanical Pressure Gauge is placed on a scissors-type jack to which a hand wheel has been attached. The spring to be tested is placed on a movable platform, or spring washer, which is part of a telescoping bar. Turning the hand wheel raises the jack, and force is applied through the gauge to the telescoping bar, thus compressing the spring upwardly against the underside of a fixed platform. A fixed scale adjacent to the moving bar permits measurement of deflection. By this means, an accurate reading of load and deflection characteristics of the spring is quickly obtained.



Dillon Mechanical Pressure Gauge *

★ ★ ★

According to **C. G. Weber,** Chief Engineer of Farris Engineering, not only is this arrangement simple to construct from available shop materials, but a considerable saving is achieved over other test methods as the cost of the Pressure Gauge is much less than that of regular spring testing machines. The device is quickly adapted to test various sizes of springs.

★ ★ ★

Although the Pressure Gauge illustrated is a 0-2500 lb. capacity unit, 8 other capacities are also available ranging from 0-10 lbs. up to 0-5000 lbs. Approximate net weight of each is 2½ lbs., and dimensions are 4¾" x 2⅛" x 3⅛". Accuracy is guaranteed to 1%±

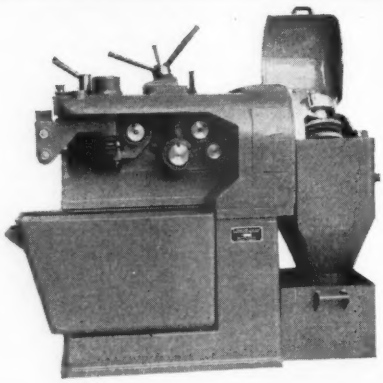
LINÉ-GORCY

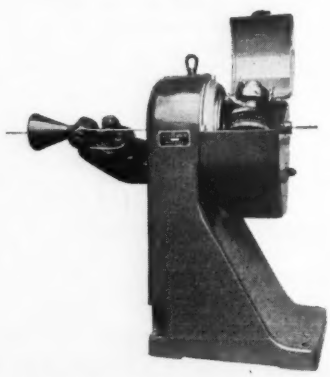
MECHANICAL

WIRE ROD DESCALERS

(Patented in U.S.A.)

Users acclaim them—
RUGGED!
EFFICIENT!
LOW IN COST!





Demonstration Descaler available for convincing tests on 1/4" max. rods in your wire mill!

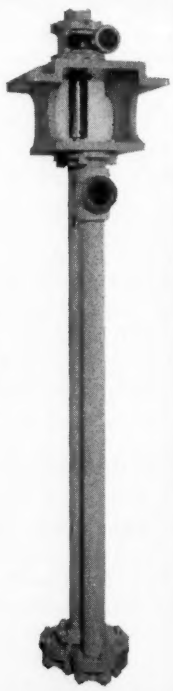
FISHER ASSOCIATES
EXCLUSIVE DISTRIBUTORS
122 East 42nd Street
New York 17, N. Y.
Telephone: OXford 7-3294

WEMCO MOLTEN METAL PUMP

(Made in U.S.A.)

Air Driven
for
Rapid Transfer
of
Molten
ZINC
LEAD
ALUMINUM
TIN
THEIR ALLOYS
and
HEAT TREATING
SALTS

Built
for
Intermittent
or
Continuous
Usage



indicated reading. Maximum indicator is optional.

★ ★ ★

The pressure gauge is manufactured by W. C. Dillon & Co., Inc., P. O. Box 3008, Van Nuys, Calif.

New Torsion Spring Tester

A Universal Tester to check loads and deflections of Torsion, Double Torsion, Spiral, Clock and Power Springs is now commercially available for the first time. It is especially useful in inspection departments of spring and product manufacturers, government arsenals and laboratories.

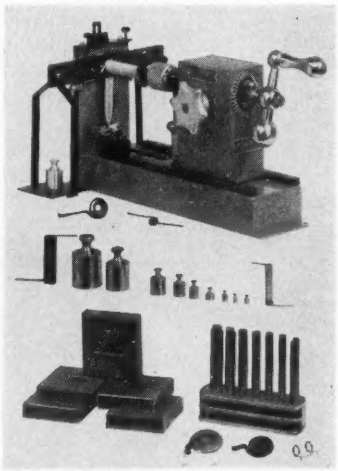
★ ★ ★

Although useful for general purpose testing, it can be used for high quantity production testing of torque and angular travel at speeds of 300 to 600 tests per hour.

★ ★ ★

The tester meets requirements of National Bureau of Standards for precision scales and is guaranteed accurate within ¼ of 1%. **Torsion** springs having wire diam. from .005 in. to .125 in., outside diam. from 1/16 in. to 6 in., lengths from 1/16 in. to 6 in., can be tested for torque from ¼ in. oz. to 48 in. lbs.

★ ★ ★



Carlson Torsion Spring Tester * * * *

To use, simply insert an arbor into chuck, with one spring arm against screw on beam and other arm against screw on chuck bar, set protractor arrow to zero, turn handle any number of revolutions or degrees required and place weights in pan until pointer registers at zero. Weights are specially marked to show torque.

★ ★ ★

Accessories include 15 arbors 1/16 in. to ½ in., block of weights ¼ in. oz. to 4 in. lbs., five 8 in. lb. weights and two adapters for extremely small springs, are provided. The dimensions measure 9 in. high, 11 in. wide, 15¾ in long; shipping weight is 35 lbs.

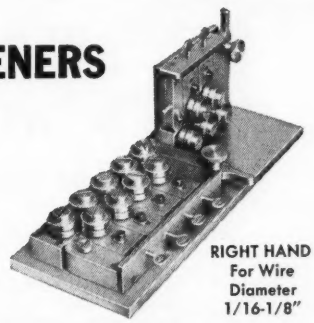
★ ★ ★

The tester is made by **The Carlson Co.**, 277 Broadway, New York 7, N. Y.

Ludlow-Saylor Buys Coast Screen Wire Concern

Ludlow-Saylor Wire Cloth Company of St. Louis has acquired the assets of **Star Wire Screen & Iron**

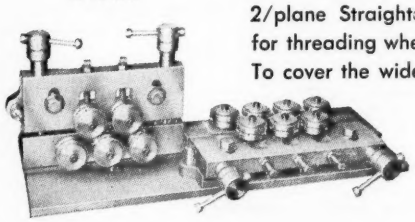
Sjogren 2 PLANE ROLL STRAIGHTENERS



RIGHT HAND
For Wire
Diameter
1/16-1/8"

Sjogren Two Plane Roll Straighteners are fully ball bearing for heavy production duty. They are designed to accommodate all sizes and grades of round or shaped wire whether it be high carbon, low carbon or copper, as well as the many alloys, from .010" to .375". Once set for the job at hand Sjogren 2/plane Straighteners may be opened and closed for threading when making coil changes without effecting the adjustment of the setting. To cover the wide range of wire diameters there are several size groups manufactured with either left or right hand direction. Each is individually produced to exact specifications for the grade, size and type of wire to be processed. Sjogren Two Plane Roll Straighteners do their duty each day, every day in the year.

LEFT HAND
For Wire Diameter
3/16-3/8"



Used by Wire Men Who Want the Best!

SINCE S&S 1927

WIRE PULLERS • WEDGE GRIPS • JAWS FOR ALL MAKES OF PULLERS AND TESTING MACHINES • CAGE ROLLERS • SWAGING HAMMERS • POINTING DIES • WIRE SPOOLERS

SJOGREN TOOL AND MACHINE CO., INC.
Tools for The Wire Industries
14 SWORD STREET, AUBURN, MASSACHUSETTS

Works of Los Angeles, and will operate this establishment under the name of **Star Wire Screen & Iron Works, Inc.** at the old location, 2515 San Fernando Road.

★ ★ ★

Star has specialized for over thirty years in the manufacture of abrasion-resistant woven wire screens and wire cloth, and through the years has developed a large clientele among the mining and mineral aggregates industries of the Pacific Coast.

★ ★ ★

Ludlow-Saylor manufactures a complete line of abrasion-resistant and corrosion-resistant wire cloths and screens for all industrial purposes, at its main plant in St. Louis. Its Los Angeles warehouse serves the important mining and manufacturing industries throughout the Coast and the Rocky Mountain States. Its mining screens have been famous throughout the mining camps of the West since 1856. Special wire cloths of stainless steel, Monel, galvanized steel, tinned steel, tinned copper, plain copper, brass, phosphor bronze, aluminum and other metals and alloys have been developed for all industrial operations where corrosion problems are more or less severe. Large stocks are carried in Los Angeles and supplemented daily from St. Louis. The addition of STARSTEEL abrasion-resistant screens to the Ludlow-Saylor line of wire cloths and screens assures Pacific Coast and Mountain States industries of prompt complete availability of all wire cloth and screen requirements.

Report on Elevated-Temperature Properties of Chromium-Molybdenum Steels

This is the second in a current series of reports prepared under the auspices of the Data and Publications Panel of the ASTM-ASME Joint Committee on Effect of Temperature on the Properties of Metals. It is a graphical summary of the elevated-temperature strength data for the chromium-molybdenum steels and includes summary curves for tensile strength; 0.2 per cent offset yield strength; per cent elongation and reduction of area; stresses for rupture; stresses for creep rates; and Larson-Miller master curves.

★ ★ ★

The Appendix contains the primary data from which the summary curves were prepared, that can be referred to when using the curves. Also included is data on chemical composition, processing, heat treatment and other pertinent information about steels included in this survey.

★ ★ ★

This important publication contains 200 figures, including summary curves for 23 steels, with more than 250 data sheets for 52 steels.

★ ★ ★

Copies of this 212-page Report, in paper covers, can be obtained

THE NEW, REVISED EDITION OF THE

WIRE & WIRE PRODUCTS BUYERS' GUIDE

will be ready for you on April 1st — order it TODAY.

It is completely revised, with many hundreds of changes in listings of rods, wire, wire products, electric wire and cable and machinery, equipment and supplies used by the wire industry. *It is the only directory covering the industry.*

This useful reference book will help you locate sources of supply for whatever you want—*when you need it.*

Members of The Wire Association receive copies without extra charge, as this service is included in their dues. Subscribers are entitled to a discount of 40 per cent.

THE PRICE: $5.00. SEND ORDER TO

WIRE AND WIRE PRODUCTS

453 MAIN STREET **STAMFORD, CONN.**

Save Time

Save Money

. . . specify Apco Mossberg Steel Reels, Spools and Bobbins first!

Profit from fifty years of Apco Mossberg experience and technical skill in providing copper wire, steel wire and wire rope manufacturers with top quality steel reels, spools and bobbins — investigate the complete Apco Mossberg line today. Apco Mossberg reels, spools and bobbins are available in all sizes and types (single heads, double heads) for every purpose. Write now for complete details . . . get your free copy of the Apco Mossberg Steel Reel Booklet. Apco Mossberg Co., Lamb Street, Attleboro, Mass.

Pacific Coast Representative
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Matson Building
215 Market Street
San Francisco, California

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Hugh P. Williams & Co.
47 Colborne Street, West
Toronto, Ontario, Canada

APCO MOSSBERG CO.
ATTLEBORO, MASS.

The original Frank Mossberg Co.

from Headquarters of the **American Society for Testing Materials,** 1916 Race Street, Philadelphia 3, Pa., at $4.75 each.

New Cutter for Steel Cable

Two new shear-type tools for cutting steel cable and wire rope have been developed by the engineering department of **H. K. Porter, Inc.,** Somerville 43, Mass. With passing jaws, notched to lock the cable in during the cut, these shears have proved effective for all cable including ACSR, soft

New Model No. 1 TN Cutter. * * * *

and hard rope, stranded guy wire and improved plow steel up to Brinell 400 or Rockwell C 42 hardness. The design minimizes crushing or deforming either coarse or fine stranded cable in the rapid cutting action. The No. 1 TN cutter cuts all cable through 3/8" diameter and the larger No. 3 TN cuts all cable through 5/8" diameter. Detailed information available from manufacturer.

Hydropress Appoints Midwest Representative

Hydropress, Inc., and its Loewy Rolling Mill Division, have appointed **Harold C. Sproule** District Sales Engineer, covering Michigan, Wisconsin and the Northern parts of Illinois, Indiana and Ohio, with headquarters at Chicago and Detroit.

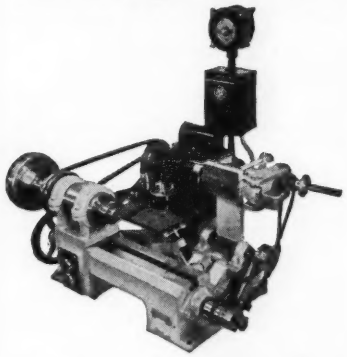
★ ★ ★

Mr. Sproule has had over twenty years experience in the design, erection and sales of Hydraulic Press equipment and Metalworking machinery. He succeeds **Roland Higgins.**

CUT Die Room COSTS 50% with the New type "M"

DYKREX
"IT CORRECTS THE DIE"

automatic Polishing Machine



Double your finished Tungsten Carbide Die production

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Save ½ labor costs—

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The new automatic polisher with the Time Switch—

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It is completely assembled—just plug it in!

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Dykrex Corporation of America
manufacturers of
Wire Die Finishing Machinery
33 Bloomfield Avenue
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Western Union
Teletype Service
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The Standard of the Wire Industry

• The top production rates designed into your machines are yours to profit by when you call upon Hans C. Bick for modern lubricants, coolants, and cutting fluids. Manufactured by specialists with 23 years' experience, these compounds are engineered for rigorous conditions such as high feeds, speeds and pressures. Furthermore, you'll like the friendly manner in which our engineers cooperate to solve the toughest problems. To get the most from your machines and tools, always call upon Hans C. Bick to smooth and cool the way.

Hans C. Bick, INC.

READING, PENNSYLVANIA

New Unit for Drawing and Packaging Wire in One Operation Announced

The Coulter & McKenzie Machine Company, 771 Water St., Bridgeport 3, Connecticut, announces a new line of wire drawing and wire packaging equipment. This machinery, which incorporates the new PAYOFFPAK principle, simplifies many problems in the packaging and handling of wire and wire products.

★ ★ ★

The machinery being introduced is the result of the Company's cooperation with the **Driscoll Wire Company** of Shelton, Connecticut (originators of the principle) and under license from the **Continental Can Company.**

★ ★ ★

The PAYOFFPAK method of wire packaging was first proven by converting existing wire drawing machines. This led Coulter & McKenzie to develop the Model 116 Continuous Machine.

★ ★ ★

This continuous Wire Drawing and Packaging Machine, designed primarily for the specialty wire trade, can be supplied to meet the industry's wide range of requirements as to speed, horsepower, and die arrangement.

★ ★ ★

The Model 126 Attachment is available to convert existing wire processing machines to this new method of wire packaging. It operates synchronously with the unit to which it is attached and feeds the wire into a PAYOFFPAK drum without loss of production or need of supplemental operations.

★ ★ ★

Coulter & McKenzie has long been associated with the wire industry and is particularly noted for its special purpose wire forming machinery. The Company's products, such as four slide, chain, bale tie, and spring machines have an operational history going back some 100 years.

MASON STYLE
NON-RETURNABLE
METAL SPOOLS
PLAIN COATED OR LITHOGRAPHED TO YOUR SPECIFICATIONS

SIZES 5" DIA. FLANGE
6 ½" DIA. FLANGE
10½" DIA. FLANGE

LOW COST
— MASS PRODUCED BY MODERN METHODS
— WE DO OUR OWN LITHOGRAPHY

QUALITY
— STURDY CONSTRUCTION
— CLOSE SUPERVISION OF LITHOGRAPHY

SERVICE
— THE BEST

WRITE TODAY TO

MASON CAN COMPANY
1949 Dexter Rd., E. Providence 14, R. I.
MASON CAN COMPANY OF OHIO
Greenville, Ohio

STANNOUS SULFATE

Saves Tin!

in liquor finishing operations

because

M & T Stannous Sulfate — a manufactured chemical— saves tin by doing away with many of the inefficiencies which accompany the treating of feather or flake tin to produce stannous sulfate on the job.

More convenient to use, too!

Baths are operable as soon as materials are dissolved. Solutions can be prepared in advance to produce desired colors and coating thicknesses.

AND, additions are made from stock solutions, assuring quick, complete mixing—eliminating any possibility of materials only partially dissolving in the bath—reducing the chances of miscalculating quantities of materials added.

Use M & T Stannous Sulfate for white or straw-color finishes. Write for technical procedure sheet.

METAL & THERMIT CORPORATION
Chemical Division
100 E. 42nd St., New York 17, N. Y.
Specialists in Tin and Tin Chemicals

New Offices Opened by Firth Sterling

Firth Sterling Inc. has established a program to streamline its sales and distribution facilities. The latest changes in distribution points, made to better serve customers in the Ohio and New York areas, are being announced.

★ ★ ★

A new office has been established at 200 North Avenue, Westfield, N. J., combining the Philadelphia and New York Offices at one headquarters. The Company will maintain New York and Philadelphia telephone service for the convenience of its customers. **Howard M. Dawson** is manager of the Mideastern District.

★ ★ ★

The Ohio District Office has changed its address to 2250 Euclid Avenue, Cleveland 15, Ohio. Former location was 142 E. 25th St., N. E. **Stuart A. Smith** is district manager.

★ ★ ★

Firth Sterling is one of the country's leading manufacturers of tool and die steel, sintered carbides, and high temperature materials.

Monsanto Building New Research Center

A $1,250,000 technical service and development program that will include a new research center for customers and industry in the plastics field has been announced by **Monsanto Chemical Company's Plastics Division** at Springfield, Mass.

★ ★ ★

Robert K. Mueller, general manager of the Plastics Division, said the new venture would intensify both the day-to-day and long-range search for new markets and new applications for plastic materials. Construction of this application research and development center, providing 44,000 square feet of additional research floor space, will get under way shortly at Springfield. The additional floor space is expected to provide working facilities for approximately 125 chem-

HAVING TROUBLE WITH LIGHT WEIGHT REELS FAILING IN HEAVY DUTY SERVICE?

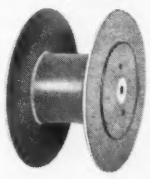
MILTON MACHINE *offers you*

A SOLUTION TO YOUR PROBLEM that'll save on replacement and maintenance!

RUGGED STEEL
HEAVY DUTY PROCESSING REELS

HEAVY DUTY REEL
Designed for the heavy duty service of a wire rope manufacturer. Flanges with rope brake rim grooves are heavily ribbed semi-steel castings.

WELDED STEEL REEL
Made to wire rope mill's specification to replace light weight pressed steel reels that failed in heavy duty service.



SOLID STEEL PROCESSING SPOOLS & BOBBINS

WRITE FOR BULLETIN 52-W
Your inquiries are invited... write or phone, our field engineer-representative will be glad to describe our facilities.

MILTON MACHINE WORKS, Inc.
DESIGNERS — ENGINEERS — MANUFACTURERS
MILTON • PENNA.

...SO BABY GREW UP

Through the years our baby has had no name.

Through the years we have been content to say we make the best lacquer in the world for insulated wire. Our customers have always agreed and kept on ordering more lacquer—but still, the best lacquer in the world, our baby, remained nameless.

So now we've christened our lacquer NELCO.

It means that NELCO has grown up.

It means that NELCO can stand on its own feet and slug it out to advantage with any other wire lacquer in the business.

It means that NELCO is proud to be known by its own name at last and will do its utmost to keep that name at the top.

As the proud parents of NELCO we'd like to tell you of the many sides to our child's character.

We have NELCO for vinyl insulated hook-up wire; NELCO for automotive high and low tension wire; NELCO for electrical tubing; and NELCO for aircraft low tension hook-up wire.

And all the time we're discovering new uses, new applications for NELCO.

This is a child to watch.

When your wire lacquering problems seem unsolvable, bring them around and let us introduce you to NELCO. The NELCO lacquers are specially tailored to overcome the most difficult problems and meet the most exacting standards.

NEW ENGLAND LACQUER CO.

150 King Philip Rd., East Providence, R. I.

ists, engineers and other technically trained personnel assigned exclusively to direct customer service for product and market development.

G.E. Moves Division to Serve Customers Better

The General Electric Company's Silicone Products Department announced the transfer of its Technical Service Unit from its Engineering Section to the Marketing Section, in an organizational move designed to bring custom engineering of silicone products closer to end-user needs.

★ ★ ★

Dr. Charles E. Reed, general manager of the department, concurrently announced that **John T. Castles** had been appointed manager of Technical Service Unit, effective January 1st. Mr. Castles will report to **Mark K. Howlett,** manager of marketing.

★ ★ ★

The Technical Service Unit's primary responsibility is to assist customers in solving their technical problems, and to compile and evaluate technical data on silicone products.

Safety Films Available

The National Safety Council's new series of human relation training films for foremen is now available.

★ ★ ★

Featuring O'Grady, the safety skeptic from the Council's film, "A Gray Day for O'Grady," this three-film set tells how a foreman learns about people.

★ ★ ★

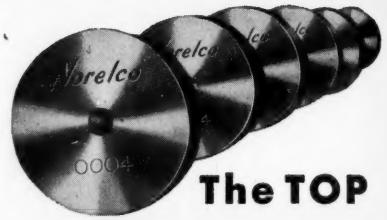
"Fragile—Handle Feelings with Care" shows how a foreman learns to value and respect the feelings of his workers.

★ ★ ★

"Call 'Em on the Carpet" shows the various methods foremen can employ to correct worker's faults without incurring ill will.

★ ★ ★

"It's an Order" is a humorous film illustrating how supervisors



The TOP DIAMOND DIES are made by PHILIPS

For your most exacting wire drawing requirements, standardize on NORELCO Diamond Dies, made by the master craftsmen of PHILIPS in the world's largest, most modern diamond die factory.

Only the very best South African and Brazilian diamonds are used. Each consists of one closed crystal. Less than .4% of all the diamonds mined meet PHILIPS high quality requirements for purity, structure and shape.

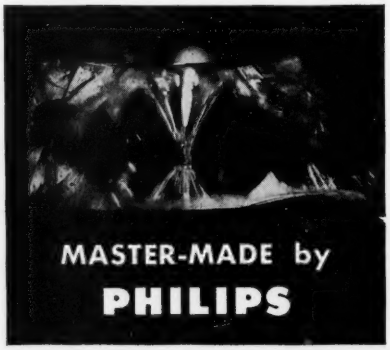
These diamonds are drilled to precision tolerances, varying in proportion to the diameter, normally 0.3 to 3.5 microns. Closer tolerances can be supplied, if required.

Let us quote on your diamond die requirements.

North American Philips Company, Inc.
Elmet Division, Lewiston, Maine

Norelco

Note below the highly polished precision shaped drawing channel of this die for drawing copper which gives a burnished finish to the wire and long life to the die.



BUNCHING
(TWISTING)
AND
STRANDING
IN THE WIRE AND
GENERAL MANUFACTURING
PROCESSES

SPECIALIZED
ENGINEERING
AND
SPECIALIZED
FACILITIES
AT YOUR SERVICE

Expanding application of twisting principles to the production of many products is reflected by an ever-increasing demand for both H-D standard equipment as well as machines especially engineered to solve varied production problems. Week after week surprising new uses are developed through the close cooperation of our engineering department with manufacturers in many fields.

Write today for our New Technical Bulletins. Tell us what you make—or contemplate making and your inquiry will receive prompt attention.

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should give orders so that they are understandable and can be carried out efficiently by the worker.

* * *

Prepared under the supervision of the Council's industrial department, the films run 12 minutes each and are available in 16mm sound movies as well as 35mm sound slidefilms.

* * *

For further information and prices write the National Safety Council, 425 N. Michigan Ave., Chicago 11, Ill.

"Some Unsolved Problems"

A 24 page booklet has been published by the ASTM under the above title.

* * *

Compiled by its Adminstrative Committee on Research, it lists a series of subjects, gives a statement of the problem, describes the present state of knowledge on it, tells what questions need to be answered and lists references to it.

* * *

Copies of the booklet will be sent free of charge by the **American Society for Testing Materials,** 1916 Race St., Philadelphia 3, Pa.

Scovill First Brass Company to Ship Wire in New Type Container

Scovill Manufacturing Company is the first brass company to package its copper-base-alloy wire in **Continental Can Company's** "Payoffpak" container, it was announced by **C. P. Goss,** vice-president in charge of mill sales. These containers hold about 300 pounds of brass wire which in the lighter gauges are equivalent to 411,000 feet, or more than 77 miles of wire. At present, conventional coils weigh only about 35 pounds each.

* * *

Mr. Goss said the new container gives wire formers many new advantages. Among them are, he said, long production runs, as each continuous coil is about eight times longer than present ones; improved storage facilities and reduced handling to machines with

BETTER WORKING CONDITIONS
FASTER BUTT WELDING
FASTER ACID NEUTRALIZING
LONGER STORAGE SAFETY
YOU GET THEM ALL WITH
BORAX 5 MOL.
RUST INHIBITOR COATING
LONGER DIE LIFE
...and ONE DIP is all that is necessary for coating steel rods

BORAX 5 MOL offers worthwhile advantages over regular borax as a satisfactory coating material on ferrous rods and wire in preparation for dry drawing. This newer material offers a higher concentration of sodium borate and therefore savings may be realized through reduced transportation, handling, and storage costs. Only about three-fourths as much Borax 5 Mol need be used to equal regular borax... yet you get the same worthwhile results!

WRITE FOR YOUR COPY OF NEW SERVICE BULLETIN

PACIFIC COAST BORAX CO.
DIVISION OF BORAX CONSOLIDATED, LIMITED
NEW YORK • CHICAGO
LOS ANGELES • CLEVELAND
PHILADELPHIA

MANUFACTURERS OF FAMOUS "20 MULE TEAM" PACKAGE PRODUCTS

A Book Every Wire Man Should Own And Read...

"STEEL WIRE IN AMERICA"

written by Kenneth B. Lewis, as only he could write. This remarkable book treats of the various operations in wire making, giving the history and theories underlying each process, tracing the development of machinery, equipment and supplies used in the industry, and naming those individuals and companies involved in the evolution of our industry to its present stage of development. A highly readable treatise. You'll like it!

The book, sponsored by the Wire Association, is an unusual contribution to the literature on the art of making wire. It is not a handbook nor reference work, but is one that will bear much reading, re-reading and study. Any wire man will be better equipped for his work through a knowledge of the contents of Mr. Lewis' book.

The edition is limited and orders can be filled only as long as the small supply lasts.

THE PRICE: $15.00

Send your order today to assure yourself of a copy.

BOOK DEPT.

THE WIRE ASSOCIATION

453 Main Street

Stamford Conn.

material kept clean, as the container protects the wire from dust, dirt and other foreign substances.

★ ★ ★

The Scovill executive said the new container is used to ship wire in diameters ranging from .016" to .060", inclusive in any temper except soft. Outside dimensions of the container are 30¾" in height and 20¾" in diameter.

New Uses for Stainless Steel Wire

Precision stainless steel wire continues to find new and varying industrial applications. As an aid to present and potential wire users, **Fort Wayne Metals, Inc.,** has announced a new specification form which gives product design, engineering and purchasing departments a definitive means of specifying wire requirements. The new form covers all known stainless steel wire subjects, and is designed both to simplify buyer procurement problems and to suggest uses.

★ ★ ★

The rapidly lengthening list of uses for which this form is proving valuable includes electronic shielding, industrial brushes, mine sweeper cable, non-magnetic stainless steel wire, filters, Spiral Four cable, magnetic recording wire, suture wire and spiral thread inserts.

★ ★ ★

A new experimental application pioneered by Fort Wayne Metals is in the use of stainless steel wire as an abrasive. In this application the wire is used to form highly accurate short radius grooves in metal blocks for magnetic wire recording heads. By oxidizing the surface of the wire to varying degrees, abrasive properties are imparted. When the wire is drawn across the metal block, a groove is formed having the same accurate radius originally provided in the abrasive wire. The method gives better results than any other known procedure for forming very short radius grooves.

★ ★ ★

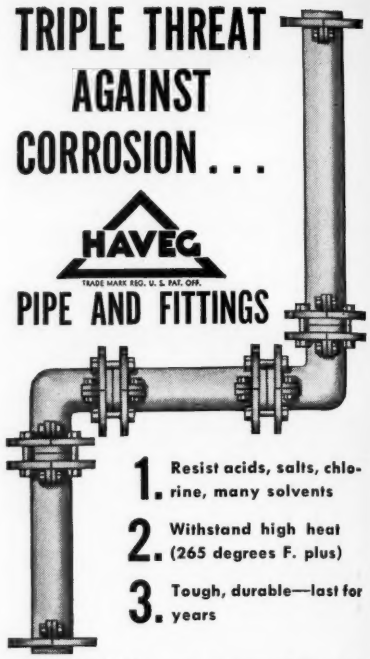
Another use reported for the

TRIPLE THREAT AGAINST CORROSION . . .

HAVEG

TRADE MARK REG. U. S. PAT. OFF.

PIPE AND FITTINGS



1. Resist acids, salts, chlorine, many solvents
2. Withstand high heat (265 degrees F. plus)
3. Tough, durable—last for years

Beat the high cost of corrosion with proven, genuine Haveg pipe and fittings. Pipe highly corrosive fluids in temperatures as high as 265 degrees F. with a good margin of safety! Since Haveg is not a coating or lining, the possibility of contamination is eliminated.

Haveg is a moldable, thermosetting plastic made by mixing acid-digested asbestos with special resins. Haveg process equipment is unusually resistant to most acids, salts, chlorine, many solvents . . . and withstands extremely high thermal shock. Haveg is really a triple threat against corrosion!

Send for 64-page Bulletin F-6. It contains complete information on Haveg pipe, fittings, valves, pumps, cylindrical and rectangular tanks, heat exchangers, and other corrosion-resistant process equipment. Call your Haveg sales engineer for first-hand facts.

PUMPS TANKS PIPE

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*A Subsidiary of Continental-Diamond Fibre Company.

SEND FOR 64-PAGE HAVEG BULLETIN F-6.

company's stainless steel wire is that of shock absorbers for delicate electronic equipment installed in aircraft, tanks and in other locations where high shock and vibration are inherent.

★ ★ ★

Designed and manufactured by Robinson Aviation, the new cushioning element utilizes specially hardened stainless steel wire which is first knitted into a sleevelike mesh. The mesh is then flattened, rolled and compressed to the proper density, after which the cylindrical roll is enclosed in a single sleeve of fine annealed wire mesh and inserted in a stainless steel coil spring in the finished shock absorber unit.

★ ★ ★

Fort Wayne Metals draws wire in diameters of from .043" to .0018", with tolerances to the nearest .0001". Standard or custom specifications can be listed on the new forms, copies of which can be obtained by writing to the company at 3211 MacArthur Drive, Fort Wayne, Ind.

Carboloy Adds New England Representative

Harold A. Sample, former supervisor of value analysis at Aeronautic and Ordnance Systems Department of **General Electric Company,** Burlington, Vt. has joined the company's Carboloy Department as a field sales representative for the New England district. He will work out of Springfield, Vt.

★ ★ ★

A native of Vermont, Sample attended the state university in Burlington as a scholarship student in science and mathematics. He then joined the Bryant Chuck & Grinder Co., Springfield, Vt. as a machinist. Prior to joining General Electric Company in 1948, he was associated with Bell Aircraft Co., Burlington, Vt., in aircraft armament for four years.

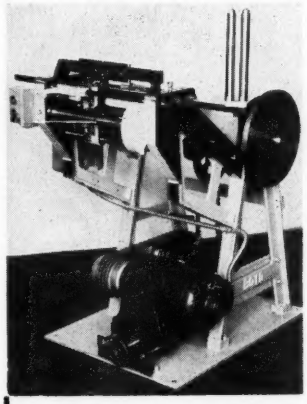
★ ★ ★

Mr. Sample organized the carbide application program at A & OS, Burlington, Vt., as well as the value analysis program, before taking charge of the latter.

FOR HEAVY DUTY COILING

USE THE NEW BOYD #1200 HEAVY DUTY SPOOLER

Designed for the spooling or coiling of heavy materials on large diameter spools or in coils.



Positive screw reversing mechanism and change gears offer a wide range of distances and speeds for traverse rates to accommodate various sizes of wire or other materials.

Large adjustable slip clutch provides constant speed of winding to allow for build-up and to produce uniformity. This makes this machine an excellent addition to your drawing or finishing machine producing your product at a point where it is to be packaged.

Supplied with gear motor and starter, Hi-Lo pulley and motor base. Can also be had with predetermining counter and auto-stop motion.

Its versatility allows it to be easily suited to meet your particular requirements in spool or coil diameters and traverse widths.

Send for full particulars

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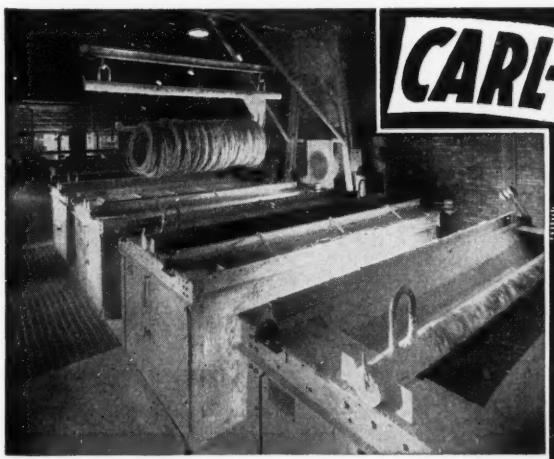
1434-38 Callowhill St. Philadelphia 30, Pa.



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HI-SPEED REGISTERED

ROD BAKERS

PATENT Nos. U.S.A. 2,235,559 2,296,361 2,323,828 CANADA 396,144 401,589

ALSO OTHER TYPES OF INDUSTRIAL OVENS AND FURNACES

GREATER SPEED AND FUEL ECONOMY PROVES OUTSTANDING ENGINEERING

Carl-Mayer Hi-Speed Rod Bakers have an exclusive heating arrangement, combining faster baking with amazing fuel economy—and a patented Blow-Off feature which removes moisture without bumping or agitating the coils. *WRITE FOR BULLETIN NO. 350.*

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Crucible Steel Co. of America
Eaton Manufacturing Co.
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Hollup Corp.
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For the past ten years we have specialized in the compounding of Vinyl extrusion and injection molding compounds to specifications, or developing compounds for a specific use.

Underwriters' approved standard compounds are available in all colors for POT, T, TW, 80 Degree C, 90 Degree C and 105 Degree C wires.

Save your plant space for wire processing equipment. Let us tailor your compounds to bring out the special properties you require.

Your inquiries are invited.

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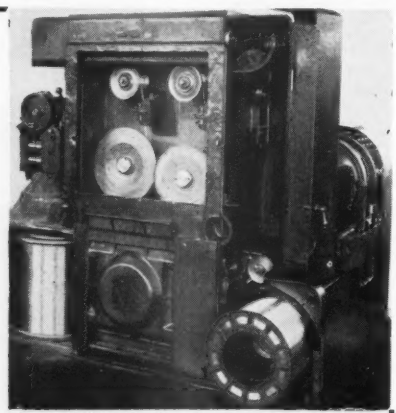
WIRE DRAWING LUBRICANTS

FOR ALL TYPES OF FERROUS AND NON-FERROUS METALS

WET OR DRY DRAW



Typical Wet Machine for Drawing Operation

You can improve your wire quality and increase your drawing efficiency by

USING "ALBANY" PRODUCTS

Our Engineers are prepared to assist you.

1868 — ADAM COOK'S SONS, INC. — 1954

LINDEN • NEW JERSEY

OTHER ALBANY PRODUCTS ARE DESIGNED FOR TUBE DRAWING AND OTHER METAL WORKING OPERATIONS

New Wire Rope Application Developed by J & L

A new kind of temperature indicator housed in a flexible steel wire rope, for use in detecting deterioration in stored grains, has been announced by **Jones & Laughlin Steel Corporation.**

★ ★ ★

The indicator consists of a plastic-coated copper circuit, with constantan thermocouples every five feet, inside the wire rope. A constantan is an alloy of nickel and copper. A thermocouple is a device to measure temperature differences.

★ ★ ★

Jones & Laughlin Steel Corporation, with headquarters in Pittsburgh, is making the cable device at its Muncy, Pa., Wire Rope Division, under license from the PTC Cable Company, St. Paul, Minn.

Clark Offers Catalytic Exhausts on Fork Lift Trucks

The OCM catalytic exhaust is now available for factory installation on gasoline-powered lift trucks and tractors manufactured by **Clark Equipment Company,** Battle Creek, Michigan.

★ ★ ★

This catalytic exhaust, manufactured by **Oxy-Catalyst, Inc.,** Wayne, Pa., oxidizes more than 95 per cent of the carbon monoxide and hydrocarbons in the engine exhaust, converting them into harmless carbon dioxide and water vapor. In so doing, it removes the hazard of carbon monoxide and hydrocarbons when gasoline engines are operated indoors.

Whitney Blake Expanding and Modernizing

The Whitney Blake Company of Hamden, Conn., is planning plant modernization in 1954 that will cost approximately $770,000. The bulk of the outlay will be for equipment required for a new method of rubber compounding. During the past year the company added 31,000 sq. ft. of manufacturing space at a cost of $560,000.

New Motor of Advanced Design Announced

A completely new motor with numerous revolutionary features and conforming in every particular with NEMA specifications is announced by **U. S. Electrical Motors Inc.** By increasing precision of manufacturing processes, holding tolerances to closer limits and improving the electrical characteristics, this new motor, designated as Uniclosed, Type H, is more compact than previous models. One outstanding feature is its complete drip-proof design which also offers splashproof protection without increased cost.

★ ★ ★

Overload capacity has not been reduced. The slot design of the laminations has been improved and the asbestos-protected windings, an exclusive feature, have been reinforced and strengthened by the addition of Mylar laminations. A desirable feature is the split dome, cast iron terminal box which makes the leads more accessible. All castings are normalized. Lubriflush lubrication of the bearings provides means of replacing old grease with new without the necessity of disassembling the motor or disturbing the bearings. The air intake is so designed to avoid pickup of dirt and dust from the floor.

★ ★ ★

Literature describing Type H Uniclosed motor may be obtained from U. S. Electrical Motors Inc., Box 2058, Los Angeles 54, California.

Braze-Type Mandrel Nibs Announced by Carboloy

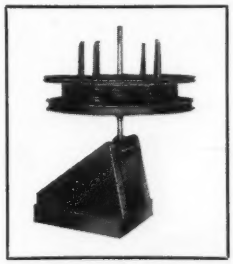
A standard line of cemented carbide unground braze-type mandrel nibs, for drawing steel, aluminum and other tubing materials, is announced by **Carboloy Department of General Electric Company**, Detroit.

★ ★ ★

Seventeen diameters are included in the stocked line, designated MN-450 to MN-1250, to facilitate nib delivery to user plants. Special nibs will still be furnished to specification.

MOSLO "SHIFTWEIGHT"
COUNTER-BALANCED WIRE REELS

Take the Manual Labor out of loading a Reel with Wire. Just unlock the knurled spindle by a twist of the wrist, tilt the reel assembly 90°, roll coil of wire to reel, lift 6" on to centering arms, release lock by twist of wrist, use spindle as lever to lift, and the *Weighted Counterbalance does the rest!*

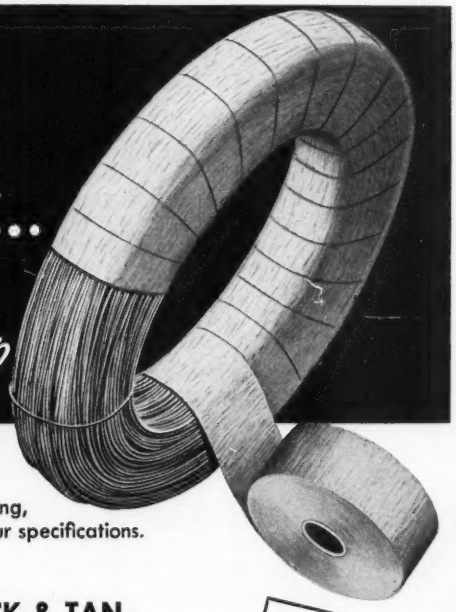


Immediate Delivery
$190.00 F.O.B. Cleveland

Capacity 300 lbs.—Min. Coil I.D. 10"—Max. O.D.—41".
All welded steel construction—Brake Equipped.

MOSLO MACHINERY COMPANY
2443 PROSPECT AVE. • CLEVELAND 15, OHIO
Telephone MAIN 1-8864

for TIGHTER ALL-ROUND PROTECTION... use NATCO Spiral Wrap



Strong, with a built-in stretch, NATCO's contour-hugging spiral wrap is superior for wire coils, tubing, metal rods and bars. Made to your specifications.

• PLAIN • WAXED
• WATERPROOF • BLACK & TAN
• GREASEPROOF • REINFORCED
• ANY SIZE ROLL—*for machine or hand-wrapping*

Write today for sample rolls, prices and complete information.

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Manufacturers of Protective Papers, Liners and Bags Since 1903
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High Quality

COPPER and BRONZE WIRE

HEAVY BUILDING WIRE

Sizes from 16 Ga. to 1000 MCM

Bare and Lead Alloy Coated

Spencer wire corporation

555 LEHIGH AVENUE, UNION, N. J.

Plants at Union, N.J., Hillside, N.J., West Brookfield, Mass.

WHAT MEMBERSHIP IN THE WIRE ASSOCIATION OFFERS YOU

FOR ANNUAL DUES OF $15.00

1. WIRE AND WIRE PRODUCTS.
   Official publication of the Association, covering the Wire Industry, its Metallurgy, Technology, Research, Processes, Machinery and Personnel.
2. THE ANNUAL BUYERS GUIDE & YEAR BOOK OF THE WIRE ASSOCIATION.
   The Year Book Section contains: Constitution and By-Laws of the Association; Details of year's meetings, etc.; List of Members, Index to Papers and Articles in WIRE & WIRE PRODUCTS.
3. QUESTION AND ANSWER SERVICE.
   Answers to technical and operating problems direct by mail. Available to members only.
4. ANNUAL CONVENTION.
   Technical sessions covering metallurgical and manufacturing problems involved in the production of ferrous and non-ferrous wire, electric wire and cable and products fabricated from wire. Plant inspections.
5. REGIONAL MEETINGS
   Attendance at the regional meetings which include Local Plant Inspections, Technical Sessions and Discussions.
6. PERSONAL CONTACTS.
   Both at Annual and Regional Meetings, and throughout the year, for interchange of helpful information.
7. INFORMATION SERVICE ON MACHINERY EQUIPMENT AND SUPPLIES.
   The files of the Association hold the answer to practically every "Where can I buy" problem. This service is available to members without charge.

For detailed information address

RICHARD E. BROWN—Executive Secretary

453 Main Street Stamford, Conn.

Range of "off-the-shelf" sizes, 0.450 to 1.250-inch according to Carboloy Department, enables users to select a size slightly larger than needed for machining to require tolerances.

Wire Company Names Technical Head

Dr. R. W. Sandelin has been appointed technical director, **Alloy Metal Wire Company,** division of **H. K. Porter Company, Inc.,** Prospect Park, Pa., it was announced by **L. L. Garber,** vice president and general manager.

★ ★ ★

Dr. Sandelin will head the metallurgical department and be responsible for quality control. He is well known in the metallurgical field and has received The Wire Association Medal Award and the American Hot Dip Galvanizers Association Gregory Memorial Award. The author of many technical papers, Dr. Sandelin is also a member of the American Society for Metals, American Institute of Mining & Metallurgical Engineers, Iron & Steel Institute (London) and the American Society for Testing Materials.

★ ★ ★

Dr. Sandelin has been with the Porter Company's Connors Steel division as Chief Metallurgist. Previous to this he had been Chief Metallurgist at Atlantic Steel Company as well as Technical Advisor, Ordnance Department, Birmingham Ordnance District.

★ ★ ★

He holds degrees of Chemical Engineer, Metallurgical Engineer and Doctor of Philosophy from the University of Minnesota.

Two New Bulletins on Tool Steels

Two bulletins, covering Firth Sterling EXTRA (a water-hardening carbon tool steel) and Firth Sterling STERLING V (a water-hardening carbon-vanadium tool steel), have been added to the catalog of popular tool steels manufactured by **Firth Sterling, Inc.,** 3113 Forbes St., Pittsburgh 30, Pa.

In these bulletins complete information is given as to typical analysis, characteristics, typical applications, forging, general heat treatment, annealing and tempering data. Copies are available upon request.

Frazure Promoted by Firth Sterling

Firth Sterling Inc., Pittsburgh, Pa., has announced the promotion of **Robert F. Frazure** from Steel Supervisor to Assistant District Manager in the Company's Chicago District. He joined Firth Sterling in 1953.

★ ★ ★

He has had seven years' experience as Purchasing Agent for DeVilbiss Manufacturing Company in Toledo, Ohio, and six years' association with Latrobe Electric Steel Company as Branch Manager in Toledo.

★ ★ ★

Before joining Firth Sterling he represented Jessop Steel Company in a sales capacity in the Chicago area. Mr. Frazure attended the University of Toledo and resides in Park Ridge, Illinois.

Union Wire Rope Man Joins Controllers Institute

Eugene A. Johnson, Jr., secretary-treasurer-controller, **Union Wire Rope Corporation,** Kansas City, Missouri, has been elected to membership in the Controllers Institute of America.

★ ★ ★

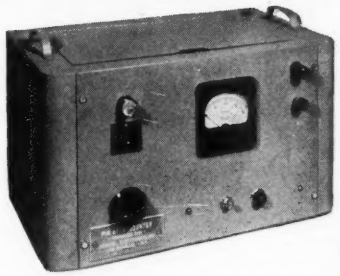
Established in 1931, the Institute is a non-profit organization of controllers and finance officers from all lines of business—banking, manufacturing, distribution, utilities, transportation, etc. The total membership exceeds 4,200.

Wire Concern Modifies Name

As of the first of the year, the name of the **Walker Wire Company** was changed to Walker Wire and Steel Company. The concern, of which **Clifford L. Jackson** is president, is located at 660 East Mile Rd., Ferndale, Mich. The change was occasioned by the broadening of the activities of the company to include several new steel items.

CONTINUOUS INSULATION TESTER FOR
MAGNET and OTHER FINE COATED WIRES

COUNTS AND RECORDS PIN HOLES AUTOMATICALLY AND ACCURATELY AT SPEEDS UP TO 600 FEET PER MINUTE.



FEATURES: 10 micro-amp fault detector • No damage to finest wire • No shocks • Moist felt electrode • No mercury • Check any length wire, up to 5 megohms • Detector operates counter, flashing lamp and rings bell • Accurate count—No repeats • Adjustable power supply and panel Voltmeter for single or multiple coated wire • Use in production lines following ovens or for inspection respooling.

Hitemp Wires, Inc., Mineola, L. I., uses the Peschel Pin Hole Tester to certify high quality and to speed up inspection.

Other production and inspection testers available

Write for details

PESCHEL ELECTRONICS, INC.
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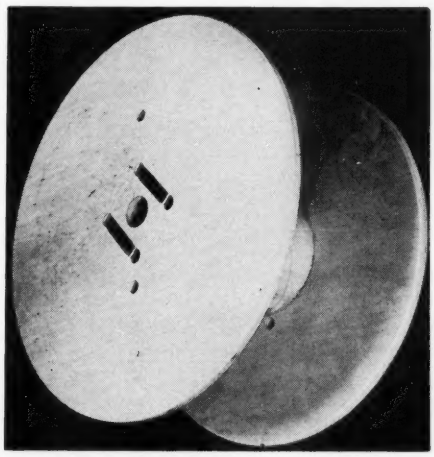
FINE PLYWOOD REELS
FOR WIRE

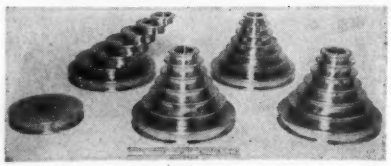


Made of air-dried wood, all parts secured with metal strapping. This reel is durable and strong. Heads cannot be dislodged by heavy side load pressures.
Reels shipped knocked down or assembled — metal strapping easily applied by standard metal fastening clips used for boxes, etc.
Heads have accurately fitted dovetail joints that give the reel extreme rigidity. Returnable and non-returnable types, made in head diameters of 6 in. to 22 in.

Shipped to any point in New England by truck
Get the facts on these fine reels

WINCHESTER REEL COMPANY, Inc.
ASHUELOT, N. H. TEL.: WINCHESTER 163-2
Our Products Carry Reel Loads.

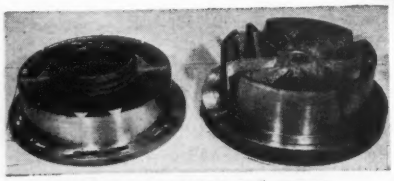
PK HARDSURFACING PAYS!



SYNCRO A-16 DRAW RINGS

Pictured at left and below are some wire drawing machine blocks. Many other parts can be hardsurfaced to advantage.

VAUGHN 20" BLOCKS



MORGAN-CONNOR 22" BLOCK

Parts last 3 to 10 times as long as standard equipment—Saves downtime — Cuts wire rejections — Increases production.

OTHER APPLICATIONS

Rollers and Idlers
Sheaves and Pulleys
Steel Crane Wheels
Hot Shear Blades

E T C.

PARKWAY-KEW CORP.

P.O. Box 504 **Tel.: Metuchen 6-4747** **Menlo Park, N. J.**

Coming Events of

THE WIRE ASSOCIATION

REGIONAL MEETING, Hotel Sheraton, Worcester, Mass., April 22-23, 1954. Ferrous and non-ferrous technical sessions and plant visits. Two full days of interest and value to wire men.

REGIONAL MEETING. Los Angeles Biltmore Hotel, Los Angeles, Cal., in June. One day session. Fudd details will be published shortly.

ANNUAL CONVENTION, Statler Hotel, Detroit, Mich., November 8-11, 1954. Ferrous and non-ferrous technical sessions and two plant inspection trips. There will be many other features, including the Annual Luncheon, the Mordica Memorial Lecture, which will be commemorative to the Silver Anniversary of the Association, and the Annual Stag-Smoker Dinner and Show.

THE WIRE ASSOCIATION

453 MAIN STREET **STAMFORD, CONN.**

Alcoa Adds Distributor for Cleveland Area

Aluminum Company of America has announced **The Hamilton Steel Company** as a second distributor of Alcoa aluminum products for the Cleveland area. Hamilton is a subsidiary of Federated Steel Corporation of Pittsburgh.

★ ★ ★

Donald C. Lott, President of Federated, said the distribution of Alcoa products will begin in December. The Hamilton organization is headed by **Earnest W. Harwell,** President.

★ ★ ★

Alcoa has had a distributor in the Cleveland area since 1929: **Williams & Company, Inc.,** 3700 Perkins Avenue.

★ ★ ★

The expanding industrial development of Cleveland and the increased use of aluminum products in the area have made necessary the additional facilities of a second distributor of Alcoa products.

To Handle Purchasing for American Chain & Cable

Effective February 1, 1954, **Clifford G. Strote,** has been appointed Director of Purchases for all divisions and subsidiaries of the American Chain & Cable Company. His headquarters will be at Bridgeport, Connecticut.

★ ★ ★

M. C. Ness has been appointed Assistant Director of Purchases, effective same date.

★ ★ ★

A. C. Curran resigned as of January 31, 1954.

Alloy Metal Wire Company Appoints General Sales Manager

E. H. Mann has been appointed General Sales Manager, **Alloy Metal Wire Company, Division of H. K. Porter Company, Inc.,** Prospect Park, Pennsylvania, it was announced by **L. L. Garber,** Vice President and General Manager.

★ ★ ★

Mr. Mann will be responsible for

all sales activities of the Company. He came to Alloy Metal Wire Company in 1949 as a sales engineer in the Middle Atlantic district and in 1953 was promoted to District Manager to establish the New England district office at Worcester, Massachusetts.

★ ★ ★

Before joining Alloy Metal Wire Company, Mr. Mann had been a Metallurgical Engineer with General Electric Company's Chemical Department where his duties involved corrosion and welding engineering and working with high nickel alloys, stainless steel, copper alloys and steels. Mr. Mann was graduated from Rensselaer Polytechnic Institute with a B.S. degree in Metallurgical Engineering.

Forbes Steel Appoints New Sales Manager

The Forbes Steel Corporation has announced the appointment of **William M. Jensen** as General Sales Manager. Mr. Jensen, who will direct the sales of Forbes welded wire fabrics, reinforcing mesh, lawn fence and flat steel washers, will make his headquarters at the company's main offices and plant in Canonsburg, Pa.

★ ★ ★

Mr. Jensen has spent his entire life in steel sales, and steps into the position of Sales Manager after having spent the last seven years as the company's Pacific Coast representative. A native San Franciscan, he was formerly with the Pittsburgh Steel Company for eleven years as Pacific Coast Manager, District Manager of the Chicago Office and District Manager of the Pittsburgh Office. He resigned in 1940 to return to San Francisco to represent several eastern steel manufacturers.

★ ★ ★

The company has also announced the appointment of **Warren M. Jensen** as Pacific Coast representative, with headquarters at 80 Stonestown, in San Francisco 27, Cal.

David H. Miller

David Henry Miller, 69, president of the **Gilbert & Bennett** Manufacturing Company in Georgetown, Conn., collapsed and died on February 8, 1954, while on a business trip in South Norwalk.

★ ★ ★

Mr. Miller was elected to the presidency of his firm in 1936 and was the third generation of his family to hold that position. He was preceded by his grandfather, **Maj. David Henry Miller** and his father, **Samuel J. Miller.**

★ ★ ★

He was a native of Georgetown, the son of Samuel J. and Esther Cannon Miller, and resided in that nearby community throughout his life. He was a graduate of Yale University and entered the service of Gilbert & Bennett shortly after completing his studies. He would have completed 50 years affiliation in the Fall.

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RETURNABLE - PLYWOOD - NON-RETURNABLE

Manufactured to Your Particular Requirements
Prompt Shipments on Large or Small Orders

Specialists in the design and manufacture of all types of
PLYWOOD REELS and SPOOLS

CARRIS REELS, INC.

"The Reel with the Plywood Barrel"

RUTLAND VERMONT

SAMPLE * to your specifications furnished FREE

HEANIUM® WIRE GUIDES

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WARDWELL BRAIDING MACHINE CO.

Remember —Heanium Guides perform best under the most difficult conditions

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MUSIC WIRE and SPECIAL WIRES

Music Wire for Industrial Purposes
211 sizes Bright Polished, .0015" to .3125"
45 sizes Bright Tinned, .003" to .125"

Aluminum—Annealed—Belt Lacing—Brass, Soft and Spring—Copper, Bare and Tinned Coppered Steel Spring—Galvanized—Tinned
Monel—Nickel Silver—Pure Soft Nickel—Oil Tempered, Steel Spring, Black Finish Phosphor Bronze, Spring Temper—Pure Iron Wire—Resistance Wire, Hoskins Chromel "A"—Stainless, Soft and Spring Temper—Tag Wire, 1000 in an Envelope—Florist Wire—Spooled and Coiled, ¼-½-1-5#
Wires Straightened and Cut to length—Small Gauges—Small orders our specialty
Wires and Strands for the fishermen. Trolling Wires, Copper-Monel-Stainless.
Leader Wires, "Wilstabrite" Stainless and "Silverbrite" Music.

THE MALIN & COMPANY

2514 Vestry Ave. Established in 1884 Cleveland 13, Ohio

REELS SPOOLS

ALL SIZES

WOOD - PLYWOOD - WOOD - METAL

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Buy the Best: MONTGOMERY SILVER-COATED COPPER WIRE

Round for Kel-F & Teflon Insulated Radio and Instrument Hook-up Wire and UHF Cables.
Flat for Tinsel Ribbons and Tinsel Garlands.
— also —
Bare Electric Tinsel Conductors for Telephone-Razor-Hearing Aid Cords.
— also —
NEVA-TARN—Metallic Yarns—Tarnish proof— for knitted and woven fabrics. Est. 1871

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WE WANT YOUR IDLE AND SURPLUS EQUIPMENT.
Highest Prices Paid
All Machines Reconditioned in Our Own Shop
WIRE & TEXTILE MACHINERY INC.
P. O. BOX 436, PAWTUCKET, R. I.

New Cutter for Soft Metal Cables

A shear type tool for cutting soft copper and aluminum cables, insulated or otherwise, sizes up to 1⅜" O.D. has been announced by **H. K. Porter, Inc.,** 74 Foley St., Somerville 43, Mass. The manufacturer states that it has the true

Cutter for soft metal cables * * * *

shear action of two sharp curved passing jaws so that the cut does not flatten or crush the cable ends but still cuts cleanly. It is for soft, non-steel metals only and is not suitable for ACSR Cable. Detailed information available from manufacturer.

Diamond-Studded Nylon Belts Used To Polish Carbide Dies

Commercial diamonds, embedded in a belt of extruded Du Pont nylon plastic, are solving die polishing problems posed by the replacement of conventional steels by ultra-hard carbide in tube and rod drawing dies.

★ ★ ★

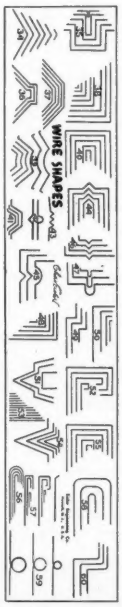
While carbide dies have upped production rates, their hardness has made polishing a continuing major problem. Diamond, the only polishing agent with sufficient hardness to cope with carbide dies, cannot be adhered satisfactorily to conventional fabric polishing belts. Where diamonds are used with the extruded nylon, however, the nylon provides a cushioning effect to keep the diamond grits from tearing out of their sockets. Further, the tough nylon resists wear so well that in tests as many as 460 dies have been polished with one belt. Finishes as fine as

For FINE WIRES from .001" to 1/16"

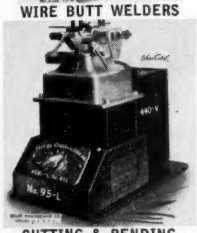
High Speed Wire Cutters and Benders. Wire Spot Welders and Wire Butt Welders. Ask for test samples. Established 1920.

FINE WIRE SPOT WELDERS

Indexing Turntables
Cam Milling Service



WIRE BUTT WELDERS



CUTTING & BENDING MACHINES

EISLER ENGINEERING CO., Inc.
747 So. 13th St., Newark 3, N. J., U. S. A.

YARNS

For electric wire. Acetate, nylon and silk, natural or dyed. Put up on braider tubes, spools or cops.

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FRANK LUNDAY
P. O. Box 1154, Charlotte, N. C.
Tel. Charlotte 8100

JOHN G. ARCHER
Fourth and Grand
West Des Moines, Ia.

one-half micro-inch r.m.s. are being obtained, according to the manufacturer.

★ ★ ★

Initially designed for removing wear rings in bell-mouthed dies, the diamond-impregnated nylon belts have been used to polish inner ball-bearing races and outside diameters of carbide rolls. In the latter instance, 20 minutes are required for belt polishing, as opposed to four hours for the hand-lapping method it has replaced.

★ ★ ★

At present, the manufacturer is experimenting with the use of flat running belts to edge-up complex tool shapes of carbide, in line with the theory that fine finishes provide longer edge life. The use of the belts for polishing glass is also contemplated.

★ ★ ★

A major advantage to the use of extruded nylon for these belts lies in the variety of shapes possible. While the nylon is extruded in flat or round section, it can be machined to any desired profile. The belts can be washed in warm, soapy water with no effect on the bond. Because of nylon's resistance to corrosion, almost any type of coolant can be used during polishing operations.

★ ★ ★

The belts are available in five grades, varying from 100-mesh sieve to 1-5 microns. Each grade is color-coded for easy identification. Widths range from one-eighth to three-eighths of an inch for standard 75 inch or 104 inch continuous belts.

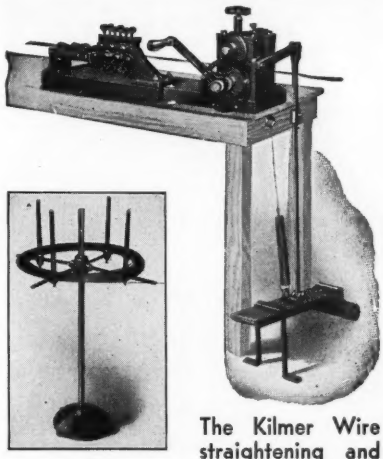
★ ★ ★

Nylon belts are manufactured by the **Hartford Special Machinery Co.**, Hartford 12, Connecticut.

Booklet on Protective Coatings

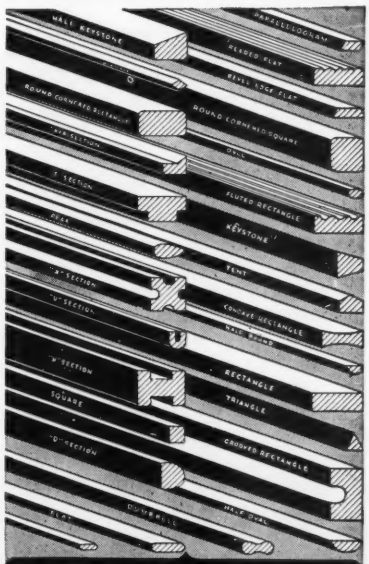
The Atlas Mineral Products Company, Mertztown, Pa., announces the availability of a booklet containing some 50 pages of information on Protective Coatings described on a generic basis.

WIRE STRAIGHTENER



The Kilmer Wire straightening and cutting machine is hand operated and recommended for wire No. 8 to No. 19 gauge.
Wire Reel will handle coils up to 150 lbs. with I.D. adjustments from 7" to 22" and 30" O.D.

M. D. KILMER & COMPANY
4840 BROOKPARK RD.
CLEVELAND 9, OHIO



Shaped Wire
TO YOUR "SPECS"

High- and Low-Carbon Steel and Non-Ferrous Wire . . . shaped to your exact specifications.

CHARTER WIRE, INC.
MILWAUKEE
Phone BRoadway 6-1329
639 E. Polk Street, Milwaukee 2, Wisconsin

METAL BOUND RETURNABLE REELS

Made in 12" to 24" diameters.

No nails used. *All glued construction.* Made of kiln-dried wood. Special design prevents breaking or splintering of wood, protecting insulated wire from damage.

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Write for prices.

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Industrial Gas Men Launch Ad Campaign on Code of Ethics

An advertising campaign to promote recognition of its recently adopted "Code of Ethics Seal" as a "hallmark of quality workmanship" has been launched by the **Industrial Equipment Division** of the **Gas Appliance Manufacturers Association.**

★ ★ ★

All of the 31 manufacturers authorized to use the seal on their products and in their advertising are being urged to give the greatest possible advertising support to the campaign—not merely to include the seal in advertising, but to step up advertising expenditures to provide for individual sponsorship of the division's code of ethics advertisements.

Beryllium Copper Alloys Stand Up in Subzero Cold

A two-year study completed at the University of Pennsylvania, the results of which are now made public by **The Beryllium Corporation,** discloses that mechanical properties of beryllium copper are able to withstand extreme temperature conditions as low as minus 300 degrees Fahrenheit.

★ ★ ★

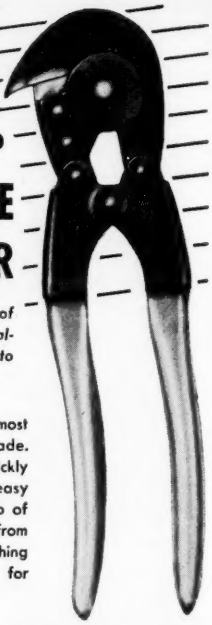
The study shows that the alloy in some respects displays improved performance in the subzero range. These findings are expected to have important bearing on the types of design materials used in equipment operating in intense cold. Such equipment would include aircraft parts and instruments, radar and devices for handling refrigerants and liquified gases.

★ ★ ★

Conducted under the direction of **Dr. Robert M. Brick,** head of the University's Department of Metallurgical Engineering, the study was sponsored by The Beryllium Corporation, Reading, Pa. Tests were confined to commercial types of wrought and cast beryllium copper alloys, marking the first time low-temperature studies have been made upon commercial grades of the alloy.

★ ★ ★

HKP PORTER HANDKLIP 6C WIRE CUTTER



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Somerville 43, Mass.
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Among important properties measured were tensile and impact strengths, elongation, and elastic modulus. Results indicate that beryllium copper performs with unhampered and even heightened efficiency under subzero conditions that generally cause failure in other standard design materials.

★ ★ ★

Details of the two-year study, along with conclusions and interpretations of the findings, are available as a four-page Technical Bulletin from The Beryllium Corporation, Reading, Pennsylvania.

Silicone Enameled Magnet Wire For "Hottest Spot" Temperatures

Intended for use in electrical equipment operating at "hottest spot" temperatures of at least 130-deg. C., a new silicone enameled magnet wire has been produced by **Anaconda Wire & Cable Co.,** Muskegon, Mich.

★ ★ ★

The wire has good abrasion resistance, adheres well to the conductor, is smooth, tough and is

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95 MARION AVENUE
PLANTSVILLE, CONN.

not attacked by common solvents. The enamel will not craze when exposed to solvents, and will not crack when subjected to extremely low temperatures (minus 65-deg. C.).

★ ★ ★

Dielectric strength of the new product is 1500 volts per mil. Best results in windings will be obtained by using Silicone treated fiberglas insulators and Silicone varnishes.

★ ★ ★

Wires insulated with the new enamel are furnished in single and heavy grades, in dimensions as given in Anaconda's General Catalog for Formvar and nylon. The film is easily removed by "chemical strippers" such as those used for Formvar, or by wire brushes.

★ ★ ★

In general, the wire has much the same appearance and "feel" of other familiar synthetic resin insulated wires. The color is reddish brown on thin-film wires; is darker colored in heavier grades. It is packaged in similar manner and may be handled and stored as other enameled magnet wires.

Armco Folder Describes Library of Available Literature

Armco Steel Corporation has issued a 4-page folder describing its stainless steel "library." Included in the literature is a 44-page general catalog; booklets on stainless steels for heat resistance; the ELC stainless types; ultra thin-gage stainless; handbooks on drawing, forming, spinning and cutting; welding stainless steels; surface finishing; machining, heat treating, forging and pickling; and a number of others.

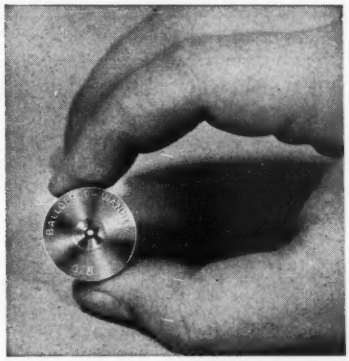
★ ★ ★

According to Armco, the purpose of these booklets is to help the user select the right grade of stainless steel and to fabricate it at low cost. Copies of the "Stainless Steel Library" may be obtained by writing to Product Information Service, Armco Steel Corporation, Middletown, Ohio.

Bolt and Nut Manufacturers Moves Branch Warehouse

H. M. Harper Co., Morton Grove, Ill. has moved its New York city plant to a newly constructed, 15,000-sq.-ft. building at 225 Hoyt Ave., Mamaroneck, N. Y. The branch office and warehouse will carry stocks of bolts, nuts, screws, washers, rivets and other corrosion-resistant fastenings produced by this company. A special service department is equipped with slotting, threading, cutting and other equipment to handle small rush orders that require special handling.

BALLOFFET VIANNEY WIRE DIE CO., Inc.



All sizes from .081" down to .0004" in stock from New York.

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Tel: Union 3-3393

Cellular Polyethylene

(*Continued from page* 291)

The unique properties of cellular polyethylene, the economics to be gained by reduction in cable size and weight, and its ease of handling in modern extrusion equipment should prove of great advantage in many electrical applications.

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DESIGNED FOR LONG LIFE AND MAXIMUM WIRE PRODUCTION

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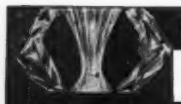
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Discussion on Precision Spring Design

(*Continued from page* 272)

be allowed to prevent binding of the spring on the supporting shaft when the spring is wound to the maximum position. Torsion springs usually have a supporting shaft and for best design, springs are coiled open wound. A simple rule that can be used in the design of torsion springs is that the shaft diameter on which the spring is supported should be approximately 90% of the smallest inside diameter of the spring when wound to its maximum position. Where space limitations are exceptionally small, torsion springs can be wound without space between coils. It is especially desirable to coil springs in this manner if no supporting shaft exists, since springs coiled open wound will have a tendency to buckle in the loading process.

Detroit Office Moved to Suburbs

The Detroit Office of **Lindberg Engineering Co.,** managed by **Frank J. Condit,** was moved in February into its new modern offices at 1220 South Woodward Avenue, Royal Oak, Michigan.

Exhaust Nuisance Abatement With Activated Carbon

(*Continued from page* 266)

manufactured by the **Connor Engineering Corp.,** Danbury, Conn., were selected to provide maximum filter face area in the minimum space.

★ ★ ★

An additional factor involved was the desirability of maintaining a slight negative pressure in the coating room to prevent exfiltration through window and door cracks causing contamination of outdoor air at street level. Here care had to be taken so as to not decrease room pressure to a point where stack draft through the ovens would be neutralized. This required careful analysis of the equipment, as well as installation of stack, suction and by-pass dampers with locking quadrants to make possible any desired mixture

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WORK ON ALL TYPES OF DIES.
UNIVERSAL WIRE DIE CO.
951 Lincoln Ave., Cranford, N. J.
CRanford 6-0116

within the temperature limits of the equipment.

★ ★ ★

Impingement dust filters of the cleanable metal type were installed preceding the bank of carbon filters to remove airborne particles and thus prevent clogging of the filter media. Following initial operation and necessary adjustments of the equipment and dampers, and with all ovens in operation, an odor removal efficiency of more than 92 per cent was obtained.

★ ★ ★

While the catalytic burners were found inadequate to appreciably reduce the odor level, and not absolutely essential to successful odor adsorption, they are helpful to the extent that they remove combustible matter, resulting in less frequent reactivation of the carbon and servicing of the dust filters, while at the same time preventing passage of gummy, unburned residue which might occur in an improperly fired oven.

★ ★ ★

An incidental but rather important effect of the installation has been an increase in the efficiency of the ovens as a result of the constant positive draft maintained by the blower suction on the stacks.

★ ★ ★

The structure housing the unit was erected on the roof but location is relatively unimportant. It is necessary, however, to make adequate provision against excessive rise in ambient temperature within the housing when the latter is in the open by insulating against sun effect with glass fiber or similar inorganic material, covered with proper membrane waterproofing protection.

★ ★ ★

In similar odor elimination installations the service life of the carbon, i.e., periods between reactivations, will vary with the nature of the gases handled, the length of operation of the ovens, and the care with which the catalysts are serviced, as well as with the obvious factors of quantity or concentration of the gases and over-all quality of workmanship.

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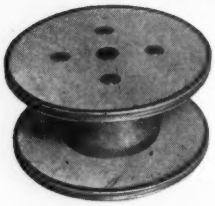

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WILL INCREASE YOUR PRODUCTION
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STANDARD MILL SUPPLY
1064-1080 MAIN ST., PAWTUCKET, R. I.

Continental Steel Corporation's New High Speed Rod Mill

(*Continued from page 264*)

the mill and the pouring reels, and a system of four conveyors is employed. These larger rods have been finished at speeds up to 2,700 feet per minute.

★ ★ ★

After cooling on the conveyors, the coils are automatically unloaded by a rotating device having six long arms. As the conveyor hook carrying a coil of rods reaches the unloader, the hook is cammed upward and back, thus discharging the coil on one of these arms, which is slightly elevated so that each coil slides forward on the arm. When five coils are deposited on the arm, the mechanism automatically rotates one sixth of a revolution, another arm is raised to receive its load of five coils, and the previously loaded arm is stripped by an overhead crane.

★ ★ ★

Obviously, with hot steel traveling through the mill at such high speeds, every conceivable safeguard is employed to confine the hot bars so that hazards are minimized. The entire finishing train is caged in, other guards are used to protect employees from the hot bars wherever possible, and each strand is provided with five strategically located shears which can cut off any misdirected bar. The shear immediately before the finishing train is equipped with a timing device which will automatically cut any bar which does not accomplish its normal course through the finishing mills.

★ ★ ★

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Morgan 4 stand Wire Drawer with pointer and 100 H.P. motor drive & motor
Waterbury Nos. 1, 2, & 3 Continuous Wire Drawing Machines
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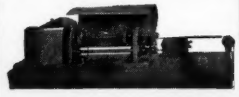
CAnal 6-2470

MODEL T-3
TORSION TESTER FOR WIRE



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Galvanizing & Tinning Installations.
Wire Flattening Mills.
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Leaflet Describes Scale Model of Annealing Furnace

Lee Wilson Engineering Co., 20005 W. Lake Road, Cleveland 16, Ohio, has issued a circular called "A Model of Annealing Performance."

★ ★ ★

This describes a scale model of the new Single Stack Portable Base annealing furnaces made by them, which demonstrates the space saving features, by which twice the production can be secured from half a given area formerly required.

★ ★ ★

Copies of this interesting circular, with model pictures and layout drawings, may be secured by writing the company.

Completes New Canadian Plant

The Torrington Manufacturing Co., producer of air impellers, spring coilers and auxiliary mill machinery, recently announced the completion of a new Oakville, Ont., plant for its wholly-owned subsidiary, The Torrington Manufacturing Co. of Canada, Ltd.

★ ★ ★

S. W. Farnsworth, chairman of the board of the parent company, said the new Canadian plant will help make Torrington's complete line of fan blades and blower wheels available to Dominion customers.

★ ★ ★

Torrington, which operates a second subsidiary in Van Nuys, Calif., and recently completed a major expansion program at its home plant, manufactures more than 325 different types of air impellers for use in all types of heating, cooling and ventilating equipment.

★ ★ ★

James W. Fry, general manager of Torrington of Canada, said the new 10,400-square-foot Oakville plant has been designed for future expansion on its five-acre site. It is equipped with fluorescent lighting, sliding plate glass windows, acoustic tile and solex glass screens which insure filtration of sun rays before they reach production areas.

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invites wire men to join the organization and participate in its activities.
Write for a booklet on what it is and how it functions to
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Fine opportunity to take full charge of low carbon fine wire drawing—annealing—tinning — galvanizing, old medium sized well established Midwestern Company.
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FOR SALES EXECUTIVE with Major Producer of Carbide Drawing Dies.
This man will be able to take charge of an existing national sales force; he must be young (30-45 age range) and dynamic; be willing to travel; be well-known in and have wide knowledge of the wire industry. Our company has been in business over 20 years. Replies held in strict confidence.
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ABRASIVES—
Elgin National Watch Co., Abrasive Div., Elgin, Ill.
Hyprez Div., Engis Equipment Co., Chicago, Ill.
Norton Co., Worcester, Mass.

ACID INHIBITORS—
(See Inhibitors, Pickling)

ACID-PROOF CONSTRUCTION—
Ceilcote Company, Cleveland, Ohio
Chemical Construction Co., Pittsburgh, Pa.
Haveg Corporation, Newark, Del.
Heil Process Equipment Corp., Cleveland, Ohio

ALLOYS—Hardsurfacing Capstans, etc.
Parkway-Kew Corp., Menlo Park, N. J.

ANNEALING MACHINES — Electric Resistance
Syncro Machine Co., Perth Amboy, N. J.
Trauwood Engr. Co., Cleveland, O.

ANNEALING POTS AND BOXES—
Scudder, E. J. Fdry. & Mach. Co., Trenton, N. J.

BAKERS—(See OVENS—Rod Bakers)

BOBBINS—Braider & Wire Weaving
Acrometal Products, Inc., Minneapolis, Minn.
Apco Mossberg Co., Attleboro, Mass.
Milton Machine Works, Inc., Milton, Pa.
Mossberg Pressed Steel Corp., Attleboro, Mass.
Standard Mill Supply Co., Pawtucket, R. I.
Wire & Textile Mach'y, Inc. (used) Pawtucket. R. I.

BORAX—Wire Drawing
Pacific Coast Borax Co., New York, N. Y.

BORON CARBIDE—
Norton Co., Worcester, Mass.

BRAKES—Pneumatic
Entwistle, Jas. L. Co., Prcvidence, R. I.

CARRIERS—Braider, High Speed
Apco Mossberg Co., Attleboro, Mass.
Mossberg Pressed Steel Corp., Attleboro, Mass.
New England Butt Co., Providence, R. I.
Wire & Textile Mach'y, Inc. (used) Pawtucket. R. I.

CASTINGS—Wire Mill
Scudder, E. J. Fdry. & Mach. Co., Trenton, N. J.

CEMENTS—Acid Proof
Ceilcote Company, Cleveland, Ohio

CEMENTS—Refractory
Norton Co., Worcester, Mass.

CLEANERS—Metal
American Chemical Paint Co., Ambler, Pa.
Apex Alkali Products Co., Phila., Pa.
Metal & Thermit Corp., New York, N. Y.
Parkin Chemical Co., The, Pittsburgh, Pa.
Standard Industrial Compounds Co., Chicago.

CLEANING & PICKLING EQUIP.—
Ceilcote Company, Cleveland, Ohio
Chemsteel Construction Co., Pittsburgh, Pa.
Cleveland Tramrail Div., of the Cleveland Crane & Engineering Co., Wickliffe, O.
Haveg Corporation, Newark, Del.
Holden, A. F., Company, The, Detroit, Mich.
Morgan Construction Co., Worcester, Mass.
Vaughn Machinery Co., Cuyahoga Falls, O.
Wean Equipment Corp., Cleveland, Ohio
Wilson, Lee, Engr. Co., Cleveland, Ohio
Youngstown Welding & Eng'g Co., Youngstown, Ohio.

CLOTH—WIRE, All Metals
Chase Brass & Copper Co., Waterbury, Conn.
Gantois, Saint Die (Vosges), France.
Wickwire Bros., Cortland, N. Y.

COATING COMPOUNDS—
Apex Alkali Products Co., Philadelphia, Pa.
Miller, R. H., Co., Inc., Homer, N. Y.
Standard Industrial Compounds Co., Chicago

COMPOUNDS—Coppering
American Chemical Paint Co., Ambler, Pa.
Miller, R. H. Co., Inc., Homer, N. Y.

COMPOUNDS—Diamond (Pre-Mixed)
Eastern Carbide Corp., New Rochelle, N. Y.
Elgin National Watch Co., Abrasives Div., Elgin, Ill.
Hyprez Div., Engis Equipment Co., Chicago.

COMPOUNDS—Extrusion, for Wire
(See Compounds—Vinyl)

COMPOUNDS—For Improving Drawing and Extrusion
American Chemical Paint Co., Ambler, Pa.

COMPOUNDS—Metal Finishing
American Chemical Paint Co., Ambler, Pa.
Apex Alkali Products Co., Philadelphia, Pa.
Metal & Thermit Corp., New York, N. Y.

COMPOUNDS—Phosphate Coating
American Chemical Paint Co., Ambler, Pa.

COMPOUNDS—Rust Preventing
American Chemical Paint Co., Ambler, Pa.
American Lanolin Corporation, Lawrence, Mass.
Apex Alkali Products Co., Philadelphia, Pa.

COMPOUNDS—Rust Removing
American Chemical Paint Co., Ambler, Pa.
Apex Alkali Products Co., Philadelphia, Pa.
Standard Industrial Compounds Co., Chicago.

COMPOUNDS—Vinyl, for Wire
Electronic Rubber Co., Stamford, Conn.

COMPOUNDS—Wire Drawing
Apex Alkali Products Co., Philadelphia, Pa.
Bick, Hans C., Inc., Reading, Pa.
Cook's Sons, Inc., Adam, Linden, N. J.
Miller, R. H. Co., Inc., Homer, N. Y.
Nopco Chemical Co., Harrison, N. J.
Pacific Coast Borax Co., New York, N. Y.
Standard Industrial Compounds Co., Chicago.
Swift & Company, Chicago, Ill.

CONDUCTORS—Flexible, Electrical
Montgomery Co., The, Windsor Locks, Conn.

COPHOLDERS—Steel
Apco Mossberg Co., Attleboro, Mass.
Mossberg Pressed Steel Corp., Attleboro, Mass.
Wire & Textile Mach'y, Inc. (used) Pawtucket. R. I.

CORDS—Electrical, Tinsel Conductor
Montgomery Co., The, Windsor Locks, Conn.

CRANES—Wire Mill
Cleveland Tramrail Div. of the Cleveland Crane & Engineering Co., Wickliffe, O.
Morgan Construction Co., Worcester, Mass.
Vaughn Machinery Co., Cuyahoga Falls, O.

CUTTING TOOLS—Carbide
Carboloy Dept. of General Electric Co., Detroit.
Eastern Carbide Corp., New Rochelle, N. Y.
Firth Sterling, Inc., Pittsburgh, Pa.
Metal Carbides Corporation, Youngstown, Ohio
Rusch Wire Die Corp., Croton-on-Hudson, N. Y.
Vascoloy-Ramet Corp., Waukegan, Ill.
Willey's Carbide Tool Co., Detroit, Mich.

CUTTING TOOLS—Wire
Porter, H. K. Inc., Somerville, Mass.

DESCALING PROCESS—Sodium Hydride
du Pont de Nemours & Co., Inc., E. I., Wilmington, Del.

DIAMONDS—Industrial
Balloffet-Vianney Wire Die Co., Inc., Guttenberg, N. J.
Rusch Wire Die Corp., Croton-on-Hudson, N. Y.
Wayne Wire Die Co., Hillside, N. J.

DIAMOND POWDERS—
Danforth, The C. W. Co., Youngstown, Ohio
Elgin National Watch Co., Abrasive Div., Elgin. Ill.
Hyprez Div., Engis Equipment Co., Chicago, Ill.
Indiana Wire Die Co., Ft. Wayne, Ind.
Industrial Diamond Powders, New Kensington, Pa.
National Research Company, St. Clair Shores, Mich.
New England Wire Die Co., Worcester, Mass.
Rusch Wire Die Corp., Croton-on-Hudson, N. Y.
Universal Wire Die Co., Cranford, N. J.
Wayne Wire Die Co., Hillside, N. J.

DIAMOND POWDER RECLAIMING—
Danforth, The C. W. Co., Youngstown, Ohio
Industrial Diamond Powders, Inc., New Kensington, Pa.
National Research Co., St. Clair Shores, Mich.
Rusch Wire Die Corp., Croton-on-Hudson, N. Y.

DIAMOND TOOLS—
Indiana Wire Die Co., Ft. Wayne, Ind.
Metal Carbides Corporation, Youngstown, Ohio
Nord International Corp., Montclair, N. J.
Universal Wire Die Co., Cranford, N. J.
Wayne Wire Die Co., Hillside, N. J.
Willey's Carbide Tool Co., Detroit, Mich.

DIES—Carbide, Tungsten & Tantalum
Balloffet-Vianney Wire Die Co., Inc., Guttenberg, N. J.
Boulin, Victor J., Inc., New York, N. Y.
Carboloy Dept. of General Electric Co., Detroit.
Eastern Carbide Corp., New Rochelle, N. Y.
Firth Sterling, Inc., Pittsburgh, Pa.
Indiana Wire Die Co., Fort Wayne, Ind.
Kelly Wire Die Corp., New York, N. Y.
Metal Carbides Corp., Youngstown, O.
Rusch Wire Die Corp., Croton-on-Hudson, N. Y.
Universal Wire Die Co., Cranford, N. J.
Vascoloy-Ramet Corp., Waukegan, Ill.
Wayne Wire Die Co., Hillside, N. J.
Willey's Carbide Tool Co., Detroit, Mich.

DIES—Cold Heading
Carboloy Dept. of General Electric Co., Detroit
Eastern Carbide Corp., New Rochelle, N. Y.
Firth Sterling, Inc., Pittsburgh, Pa.
Indiana Wire Die Co., Ft. Wayne, Ind.
Metal Carbides Corporation, Youngstown, Ohio
Vascoloy-Ramet Corp., Waukegan, Ill.
Willey's Carbide Tool Co., Detroit, Mich.

DIES—Diamond
Ajax Industrial Supplies, Inc., Fort Wayne, Ind.
Balloffet-Vianney Wire Die Co., Inc., Guttenberg, N. J.
Boulin, Victor J., Inc., New York, N. Y.
Cochaud Wire Die Inc., New York, N. Y.
Ft. Wayne Wire Die, Inc., Fort Wayne, Ind.
Indiana Wire Die Co., Ft. Wayne, Ind.
Kelly Wire Die Corp., New York, N. Y.
New England Wire Die Co., Worcester, Mass.
North American Philips Co., Inc., Elmet Div., Lewiston, Me.
Rusch Wire Die Corp., Croton-on-Hudson, N. Y.
Universal Wire Die Co., Cranford, N. J.
Wayne Wire Die Co., Hillside, N. J.

DIES—Extrusion
Carboloy Dept. of General Electric Co., Detroit.
Eastern Carbide Corp., New Rochelle, N. Y.
Firth Sterling, Inc., Pittsburgh, Pa.
Metal Carbides Corporation, Youngstown, Ohio
Rusch Wire Die Corp., Croton-on-Hudson, N. Y.
Universal Wire Die Co., Cranford, N. J.
Wayne Wire Die Co., Hillside, N. J.
Willey's Carbide Tool Co., Detroit, Mich.

DIES—Eyelet
Eastern Carbide Corp., New Rochelle, N. Y.
Kelly Wire Die Corp., New York, N. Y.

DIES—Nail, Nail Cutters, Feeder Blocks, Grippers, etc.
Firth Sterling, Inc., Pittsburgh, Pa.
Pittsburgh Carbide Die Co., Monongahela, Pa.

DIES—Pointing
Sjogren Tool and Machine Co., Auburn, Mass.

DIES—Repairs & Re-Cutting
Ajax Industrial Supplies, Inc., Fort Wayne, Ind.
Balloffet-Vianney Wire Die Co., Inc., Guttenberg, N. J.
Boulin, Victor J., Inc, New York, N. Y.
Carboloy Dept. of General Electric Co., Detroit.
Cochaud Wire Die Inc., New York, N. Y.
Eastern Carbide Corp., New Rochelle, N. Y.
Firth Sterling, Inc., Pittsburgh, Pa.
Ft. Wayne Wire Die., Inc., Fort Wayne, Ind.
Indiana Wire Die Co., Ft. Wayne, Ind.
Kelly Wire Die Corp., New York, N. Y.
Metal Carbides Corporation, Youngstown, Ohio
New England Wire Die Co., Worcester, Mass.
North American Philips Co., Inc., Elmet Div., Lewiston, Me.
Rusch Wire Die Corp., Croton-on-Hudson, N. Y.
Universal Wire Die Co., Cranford, N. J.
Vascoloy-Ramet Corp., Waukegan, Ill.
Wayne Wire Die Co., Hillside, N. J.

DIES—Special Shapes, Etc.
Eastern Carbide Corp., New Rochelle, N. Y.
Firth Sterling, Inc., Pittsburgh, Pa.
Indiana Wire Die Co., Ft. Wayne, Ind.
Willey's Carbide Tool Co., Detroit, Mich.

DIES—Swaging
Sjogren Tool and Mach. Co., Inc., Auburn, Mass.

DIES—Tube Drawing
Balloffet-Vianney Wire Die Co., Inc., Guttenberg, N. J.
Carboloy Dept. of General Electric Co., Detroit.
Eastern Carbide Corp., New Rochelle, N. Y.
Firth Sterling, Inc., Pittsburgh, Pa.
Indiana Wire Die Co., Fort Wayne, Ind.
Kelly Wire Die Corp., New York, N. Y.
Metal Carbides Corp., Youngstown, O.
Rusch Wire Die Corp., Croton-on-Hudson, N. Y.
Vascoloy-Ramet Corp., Waukegan, Ill.
Willey's Carbide Tool Co., Detroit, Mich.

DRAW BENCHES—
(See MACHINERY—Draw Benches)

DRUMS & TRAVERSES—For Cable Reels
Entwistle, Jas. L. Co., Providence, R. I.
Hubbard Spool Co., Garrett, Ind.
New York Engineering Co., Yonkers, N. Y.
Republic Steel Corp., Pressed Steel Div., Niles, Ohio

DRYING EQUIPMENT
Carl-Mayer Corp., The, Cleveland, Ohio
Industrial Ovens, Inc., Cleveland, Ohio.
Rockwell, W. S. Co., Fairfield, Conn.

ENGINEERS—Consulting
Lubricants—Hans C. Bick, Inc., Reading, Pa.
Wire Mill—Clarence S. Arms, Worcester, Mass.
Zinc—Imhoff, Wallace G., Co., No. Highlands, Calif.

EYELETS—Brass or Zinc
Platt Bros. & Co., The, Waterbury, Conn.

FENCING & FENCES—Wire
Interlocking Fence Co., Morton, Ill.

FOAM PRODUCING COMPOUNDS—
American Chemical Paint Co., Ambler, Pa.
Parkin Chemical Co., The, Pittsburgh, Pa.

FURNACES—Brazing
Electric Furnace Co., Salem, Ohio
Harper Electric Furnace Corp., Buffalo, N. Y.
Lepel High Frequency Laboratories, Inc., New York, N. Y.
Rockwell, W. S. Co., Fairfield, Conn.

FURNACES—Galvanizing Equipment
Ajax Electric Co., Inc., Philadelphia, Pa.
Electric Furnace Co., Salem, Ohio
Holden, A. F. Co., The, Detroit, Mich.
Rockwell, W. S. Co., Fairfield, Conn.
Surface Combustion Corp., Toledo, Ohio
Trauwood Engineering Co., The, Cleveland, Ohio
Wilson, Lee, Engr. Co., Cleveland, Ohio

WHERE TO BUY, Continued

For more complete information, consult the annual Wire and Wire Products Buyers' Guide.

FURNACES—Heat Treating
Ajax Electric Co., Inc., Philadelphia, Pa.
Carl Mayer Corp., The, Cleveland, Ohio
Electric Furnace Co., Salem, Ohio
Holden, A. F., Co., The, Detroit, Mich.
Lepel High Frequency Laboratories, Inc., New York, N. Y.
Morrison, John R., Industries, Inc., Cleveland, Ohio
Rockwell, W. S., Co., Fairfield, Conn.
Spring Mfgs. Supply Co., Plantsville, Conn.
Surface Combustion Corp., Toledo, Ohio
Trauwood Engr. Co., Cleveland, Ohio
Wilson, Lee, Engr. Co., Cleveland, Ohio

FURNACES—Induction
Lepel High Frequency Laboratories, Inc., New York, N. Y.

FURNACES—Lead Melting
Electric Furnace Co., Salem, Ohio
Rockwell, W. S. Co., Fairfield, Conn.
Surface Combustion Corp., Toledo, Ohio

FURNACES—Pot (oil, gas, electric)
Ajax Electric Co., Inc., Philadelphia, Pa.
Holden, A. F., Co., The, Detroit, Mich.

FURNACES—Resistance Heating, Strand
(See Annealing Machines)

FURNACES—Salt Bath
Ajax Electric Co., Inc., Philadelphia, Pa.
Electric Furnace Co., Salem, Ohio
Holden, A. F., Co., The, Detroit, Mich.
Rockwell, W. S. Co., Fairfield, Conn.
Surface Combustion Corp., Toledo, Ohio

GALVANIZING EQUIPMENT — (See MACHINERY—Galvanizing Wire)

GRINDERS—Roll
Norton Co., The, Worcester, Mass.

GUIDES—for Wire
Heany Industrial Ceramic Corp., New Haven, Conn.

GUIDE TIPS—For Extruding Machines (See NOZZLES)

HAMMERS—Nail Heading
Firth Sterling, Inc., Pittsburgh, Pa.
Pittsburgh Carbide Die Co., Monongahela, Pa.

HAMMERS—Swaging
Sjogren Tool and Machine Co., Auburn, Mass.

HARDSURFACING ALLOYS—
(See Alloys—Hardsurfacing)

HOOKS—Pickling & Liming
Youngstown Welding & Eng'g Co., Youngstown, Ohio

HOISTS—Electric Travelling
Cleveland Tramrail Div. of the Cleveland Crane & Engineering Co., Wickliffe, Ohio

INHIBITORS—Pickling
American Chemical Paint Co., Ambler, Pa.
Apex Alkali Products Co., Philadelphia, Pa.
Parkin Chemical Co., The, Pittsburgh, Pa.

INSULATING MATERIALS—
Celanese Corporation of America, New York, N. Y.
Electronic Rubber Co., Stamford, Conn.
Glass Fibers, Inc., Toledo, Ohio
Heineman Corp., Oscar, Chicago, Ill.
Merrimac Paper Co., New York, N. Y.
Naugatuck Chemical Division of United States Rubber, Naugatuck, Conn.
New England Lacquer Co., E. Providence, R. I.

INSULATING MATERIALS — Paper—For Electric Wire Cable
Merrimac Paper Co., New York, N. Y.

LACQUERING SYSTEMS — See MACH.—Lacquering Electric Wire

LACQUERS—For Electric Wire
New England Lacquer Co., E. Providence, R. I.

LAME—LAHN—
Montgomery Co., The, Windsor Locks, Conn.

LIME—
Warner Co., The, Philadelphia and Bellefonte, Pa.

LUBRICANTS — For Metal Cutting, Stamping and Drawing
Apex Alkali Products Co., Philadelphia, Pa.
Miller, R. H., Co., Inc., Homer, N. Y.
Nopco Chemical Co., Harrison, N. J.
Standard Industrial Compounds Co., Chicago.

LUBRICANTS—Wire Drawing
(See Compounds—Wire Drawing)

LUBRICANTS—Wire Rope
Swift & Co., Chicago, Ill.

MACHINERY—Armoring (Cable, Wire, Hose)
American Insulating Mach'y Co., Phila., Pa.
Sleeper & Hartley, Inc., Worcester, Mass.
Watson Machine Co., Paterson, N. J.
Wire & Textile Mach'y, Inc., (used), Pawtucket, R. I.

MACHINERY—Barbed Wire
Glader, Wm., Machine Works, Chicago, Ill.
Wafios, Maschinenfabrik, Reutlingen 3, Wurtt., Germany
Wean Engineering Co., Cleveland, Ohio

MACHINERY—Braiding
Fidelity Machine Co., Inc., Philadelphia, Pa.
New England Butt Co., Providence, R. I.
Wardwell Braiding Mach. Co., Central Falls, R.I.
Wire & Textile Mach'y, Inc. (used) Pawtucket, R. I.

MACHINERY—Bunching
Cook Manufacturing Co., The, Paterson, N. J.
Federal Manufacturing Co., Wallingford, Conn.
Haskell-Dawes Machine Co., Philadelphia, Pa.
New England Butt Co., Providence, R. I.
Niehaus, K. A., Maschinenfabrik, Dusseldorf-Rath, Germany
Sleeper & Hartley, Inc., Worcester, Mass.
Watson Machine Co., Paterson, N. J.
Wire & Textile Mach'y, Inc. (used) Pawtucket, R. I.

MACHINERY—Bundling, Scrap
Sleeper & Hartley, Inc., Worcester, Mass.
Vaughn Machinery Co., Cuyahoga Falls, O.

MACHINERY—Cable, Electric
American Insulating Mach'y Co., Phila., Pa.
Fidelity Machine Co., Inc., Philadelphia, Pa.
Haskell-Dawes Machine Co., Philadelphia, Pa.
New England Butt Co., Providence, R. I.
New York Engineering Co., Yonkers, N. Y.
Niehaus, K. A., Maschinenfabrik, Dusseldorf-Rath, Germany
Sleeper & Hartley, Inc., Worcester, Mass.
Syncro Machine Co., Perth Amboy, N. J.
Watson Machine Co., Paterson, N. J.

MACHINERY—Capstans (See Machinery—Winding Wire)

MACHINERY—Chain Making
Cosa Corporation, New York, N. Y.
Nilson, A. H. Machine Co., Bridgeport, Conn.
Wafios, Maschinenfabrik, Reutlingen 3, Wurtt., Germany

MACHINERY—Closing Rope
Niehaus, K. A., Maschinenfabrik, Dusseldorf-Rath, Germany
Watson Machine Co., Paterson, N. J.

MACHINERY—Coiling Rod
Vaughn Mach'y Co., Cuyahoga Falls, O.
Waterbury-Farrel Fdry. & Mach. Co., Waterbury, Conn.

MACHINERY—Cold Heading
Waterbury-Farrel Fdry. & Mach. Co., Waterbury, Conn.

MACHINERY—Copper Wire Drawing
Aetna-Standard Engineering Co., Pittsburgh.
American Insulating Mach'y Co., Phila., Pa.
National Mach'y Exch. (Used), New York.
Syncro Machine Co., Perth Amboy, N. J.
Torrington Mfg. Co., Torrington, Conn.
Vaughn Machinery Co., Cuyahoga Falls, O.
Waterbury-Farrel Fdry. & Mach. Co., Waterbury, Conn.

MACHINERY—Covering Wire (See MACHINERY—Insulating Wire)

MACHINERY—Cutting
Eisler Engineering Co., Newark, N. J.
Lewis Machine Co., The, Cleveland, Ohio
Mettler Machine Tool, Inc., New Haven, Conn.
Wean Equipment Corp., Cleveland, Ohio
Wells, Frank L., Co., Kenosha, Wis.

MACHINERY—Descaling Rod, Dry
Fisher Associates, New York, N. Y.

MACHINERY—Diameter Testing Continuous
Standard Electronic Research Corp., New York, N. Y.

MACHINERY—Die Making
Boulin, Victor J., Inc., New York, N. Y.
Carboloy Dept. General Electric Co., Detroit, Mich.
Dykrex Corp., Roos Tool & Mfg. Div., Newark, N. J.
Firth Sterling, Inc., Pittsburgh, Pa.
Kelly Wire Die Corp., New York, N. Y.
Nord International Corp., Montclair, N. J.
Wayne Wire Die Co., Hillside, N. J.

MACHINERY—Draw Benches
Morgan Construction Co., Worcester, Mass.
Torrington Mfg. Co., Torrington, Conn.
Vaughn Machinery Co., Cuyahoga Falls, O.

MACHINERY—Dry Blending, Plastics
Robinson Manufacturing Co., New York, N. Y.

MACHINERY—Electrode Grinding
Cosa Corporation, New York, N. Y.

MACHINERY—Edging (See MACHINERY — Tandem Rolling and Edging Mills)

MACHINERY—Enameling
American Insulating Mach'y Co., Phila., Pa.
Cook Manufacturing Co., The, Paterson, N. J.
Industrial Ovens, Inc., Cleveland, Ohio
Rockwell Co., W. S., Fairfield, Conn.

MACHINERY—Extruding
Aetna-Standard Engineering Co., Pittsburgh.
Davis-Standard Sales Corp., Mystic, Conn.
Entwistle Co., J. L., Providence, R. I.
Royle, John, & Sons, Paterson, N. J.
Wire & Textile Mach'y, Inc. (used) Pawtucket, R. I.

MACHINERY—Fence
Glader, Wm., Machine Works, Chicago, Ill.
Interlocking Fence Co., Morton, Ill.
Malmedie Maschinenfabrik, Dusseldorf, Germany
Wean Equipment Corp., Cleveland, Ohio

MACHINERY—Filament Coil Winding
Eisler Engineering Co., Newark, N. J.

MACHINERY—Flat Wire
Mettler Machine Tool, Inc., New Haven, Conn.
Torrington Mfg. Co., Torrington, Conn.
Wean Equipment Corp. Cleveland, Ohio

MACHINERY—Forming Wire
Baird Machine Co., Stratford, Conn.
Nilson, A. H., Machine Co., Bridgeport, Conn.
Wafios, Maschinenfabrik, Reutlingen 3, Wurtt., Germany

MACHINERY—Galvanizing Wire
Sleeper & Hartley, Inc., Worcester, Mass.
Steel Equipment Co., Cleveland, Ohio
Vaughn Machinery Co., Cuyahoga Falls, O.
Wean Equipment Corp., Cleveland, O.
Wilson, Lee, Engr. Co., Cleveland, Ohio

MACHINERY—Gang Winders
Entwistle, Jas. L. Co., Providence, R. I.
Syncro Machine Co., Perth Amboy, N. J.
Watson Machine Co., Paterson, N. J.

MACHINERY—Grinding
Norton Co., The, Worcester, Mass.

MACHINERY—Insulating Wire
Aetna-Standard Engineering Co., Pittsburgh, Pa.
American Insulating Mach'y Co., Phila., Pa.
Davis-Standard Sales Corp., Mystic, Conn.
Ets. Pourtier Frères, Romainville, France
Fidelity Machine Co., Inc., Philadelphia, Pa.
New England Butt Co., Providence, R. I.
Royle, John & Sons, Paterson, N. J.
Syncro Machine Co., Perth Amboy, N. J.
Wardwell Braiding Mach. Co., Central Falls, R.I.
Watson Machine Co., Paterson, N. J.

MACHINERY—Knitting
Fidelity Machine Co., Inc., Philadelphia, Pa.

MACHINERY—Lacquering Electric Wire
American Insulating Mach'y Co., Philadelphia.
Cook Mfg. Co., The, Paterson, N. J.
Industrial Ovens, Inc., Cleveland, O.

MACHINERY—Lock Washer
Sleeper & Hartley, Inc., Worcester, Mass.

MACHINERY—Looms, Wire Weaving
Interlocking Fence Co., Morton, Ill.
Wafios, Maschinenfabrik, Reutlingen 3, Wurtt., Germany

MACHINERY—Material Handling
(See Material Handling Equipment)

MACHINERY—Measuring Wire & Cable
Davis Electric Co., Wallingford, Conn.
Durant Mfg. Co., Milwaukee, Wis.
Entwistle, Jas. L. Co., Providence, R. I.
New England Butt Co., Providence, R. I.
Standard Mill Supply Co., Pawtucket, R. I.
Watson Machine Co., Paterson, N. J.

MACHINERY—Nail and Tack
Baird Machine Co., The, Stratford, Conn.
Glader, Wm., Machine Works, Chicago, Ill.
National Mach'y Exch. (Used), New York, N. Y.
Sleeper & Hartley, Inc., Worcester, Mass.
Wafios, Maschinenfabrik, Reutlingen 3, Wurtt., Germany

MACHINERY—Pickling
Chemsteel Construction Co., Pittsburgh, Pa.
Youngstown Welding & Eng'g Co., Youngstown, Ohio.

MACHINERY—Pin Making
Baird Machine Co., The, Stratford, Conn.
Cosa Corporation, New York, N. Y.

MACHINERY—Pointing
Aetna-Standard Engineering Co., Pittsburgh, Pa.
Morgan Construction Co., Worcester, Mass.
National Mach'y Exch. (Used), New York, N. Y.
Scudder, E. J., Fdry. & Mach. Co., Trenton, N. J.
Sleeper & Hartley, Inc., Worcester, Mass.
Syncro Machine Co., Perth Amboy, N. J.
Vaughn Machinery Co., Cuyahoga Falls, O.
Waterbury-Farrel Foundry & Machine Co., Waterbury, Conn.
Wean Equipment Corp., Cleveland, Ohio

MACHINERY—Poultry Wire Fencing
Interlocking Fence Co., Morton, Ill.
Malmedie Maschinenfabrik, Dusseldorf, Germany
Wean Equipment Corp., Cleveland, O.

WHERE TO BUY, Continued

For more complete information, consult the annual Wire and Wire Products Buyers' Guide.

MACHINERY—Re-Spooling
Boyd & Sons Manufacturing Corp., Philadelphia, Pa.
Davis Electric Co., Wallingford, Conn.
Eisler Engineering Co., Newark, N. J.
Emory, Robert J., Co., Newark, N. J.
Entwistle, Jas. L. Co., Providence, R. I.
National Mach'y Exch. (Used), New York, N. Y.
Steel Equipment Co., Cleveland, Ohio
Vaughn Machinery Co., Cuyahoga Falls, O.
Watson Machine Co., Paterson, N. J.
Wean Equipment Corp., Cleveland, Ohio
Wire & Textile Mach'y, Inc. (used) Pawtucket, R. I.
Wire Insulating Machy., Div. of Machinery Electrification, Inc., Worcester, Mass.

MACHINERY—Rod Mill
Morgan Construction Co., Worcester, Mass.
Wean Equipment Corp., Cleveland, Ohio

MACHINERY—Rolling Mill
Morgan Construction Co., Worcester, Mass.
Torrington Mfg. Co., Torrington, Conn.
Waterbury-Farrel Foundry & Machine Co., Waterbury, Conn.

MACHINERY—Rubber Insulating
Davis-Standard Sales Corp., Mystic, Conn.
Royle, John & Sons, Paterson, N. J.
Wire & Textile Mach'y, Inc. (used) Pawtucket, R. I.

MACHINERY—Spark Testing
Davis Electric Co., Wallingford, Conn.
Entwistle, Jas. L. Co., Providence, R. I.
Federal Manufacturing Co., Wallingford, Conn.
Peschel Electronics, Inc., New Rochelle, N. Y.
Wire & Textile Mach'y, Inc. (used) Pawtucket, R. I.

MACHINERY—Spring Making
Carlson Company, The, New York, N. Y.
Lundahl Corp., Winsted, Conn.
National Mach'y Exch. (Used), New York, N. Y.
Sleeper & Hartley, Inc., Worcester, Mass.
Torrington Mfg. Co., Torrington, Conn.
Wafios, Maschinenfabrik, Reutlingen 3, Wurtt., Germany
Wells, Frank L., Co., Kenosha, Wisc.

MACHINERY—Staple
Sleeper & Hartley, Inc., Worcester, Mass.
Wafios, Maschinenfabrik, Reutlingen 3, Wurtt., Germany.

MACHINERY—Straightening & Cutting
Cosa Corporation, New York, N. Y.
Kilmer, M. D., & Co., Cleveland, Ohio
Lewis Machine Co., The, Cleveland, Ohio
Medart Co., The, St. Louis, Mo.
Mettler Machine Tool Co., New Haven, Conn.
National Mach'y Exch. (Used), New York, N. Y.
Wells, Frank L., Co., Kenosha, Wisc.

MACHINERY—Stranding
Haskell-Dawes Machine Co., Philadelphia, Pa.
Hughesville Machine & Tool Co., Hughesville, Pa.
Maillefer S. A., Renens-Lausanne, Switzerland.
Milton Machine Works, Inc., Milton, Pa.
New England Butt Co., Providence, R. I.
Niehaus, K. A., Maschinenfabrik, Dusseldorf-Rath, Germany
Robinson Manufacturing Co., New York, N. Y.
Sleeper & Hartley, Inc., Worcester, Mass.
Syncro Machine Co., Perth Amboy, N. J.
Watson Machine Co., Paterson, N. J.

MACHINERY—Studmaking
Cosa Corporation, New York, N. Y.

MACHINERY—Swaging
Waterbury-Farrel Foundry & Machine Co., Waterbury, Conn.

MACHINERY—Take-Up and Pay-Out
Aetna-Standard Engineering Co., Pittsburgh, Pa.
American Insulating Mach'y Co., Phila., Pa.
Davis Electric Co., Wallingford, Conn.
Davis-Standard Sales Corp., Mystic, Conn.
Federal Manufacturing Co., Wallingford, Conn.
Industrial Ovens, Inc., Cleveland, Ohio
New York Engineering Co., Yonkers, N. Y.
Robinson Manufacturing Co., New York, N. Y.
Standard Mill Supply Co., Pawtucket, R. I.
Watson Machine Co., Paterson, N. J.
Wire Insulating Machy., Div. of Machinery Electrification, Inc., Worcester, Mass.

MACHINERY—Taping
American Insulating Mach'y Co., Phila., Pa.
Ets. Pourtier Frères, Romainville, France
New England Butt Co., Providence, R. I.
Syncro Machine Co., Perth Amboy, N. J.
Watson Machine Co., Paterson, N. J.
Wire & Textile Mach'y, Inc. (used) Pawtucket, R. I.

MACHINERY—Testing Magnet Wire Coatings for Pin Holes
Peschel Electronics, Inc., New Rochelle, N. Y.

MACHINERY—Testing, Physical
Lundahl Corp., Winsted, Conn.
Scott Testers, Inc., Providence, R. I.
Spring Mfgs. Supply Co., Plantsville, Conn.

MACHINERY—Tinning Wire
American Insulating Mach'y Co., Phila., Pa.
Cook Manufacturing Co., The, Paterson, N. J.
Steel Equipment Co., Cleveland, Ohio
Syncro Machine Co., Perth Amboy, N. J.
Wean Equipment Corp., Cleveland, Ohio

MACHINERY—Tinsel Rolling Mills
American Insulating Mach'y Co., Phila., Pa.

MACHINERY—Trolley Wire
Torrington Mfg. Co., Torrington, Conn.
Vaughn Machinery Co., Cuyahoga Falls, O.

MACHINERY—Tube Mill, Cold Drawing
Aetna-Standard Engineering Co., Pittsburgh, Pa.
Mettler Machine Tool, Inc., New Haven, Conn.

MACHINERY—Twinning
(See Mach.—Bunching)

MACHINERY—Twisters, Wire
Cook Manufacturing Co., The, Paterson, N. J.
Davis Electric Co., Wallingford, Conn.
Federal Manufacturing Co., Wallingford, Conn.
Haskell-Dawes Machine Co., Philadelphia, Pa.

MACHINERY—Used
National Machinery Exchange, New York, N. Y.
Wire & Textile Machy., Inc., Pawtucket, R. I.

MACHINERY—for Wire Welding (See WELDERS—Butt and Spot)

MACHINERY—Washer Forming
Cosa Corporation, New York, N. Y.

MACHINERY—Winding Wire
Eisler Engineering Co., Newark, N. J.
Emory, Robert J., Co., Newark, N. J.
Entwistle, Jas. L., Co., Providence, R. I.
Federal Manufacturing Co., Wallingford, Conn.
New England Butt Co., Providence, R. I.
Standard Mill Supply Co., Pawtucket, R. I.
Watson Machine Co., Paterson, N. J.
Wire Insulating Machy., Div. of Machinery Electrification, Inc., Worcester, Mass.

MACHINERY—Wire Bending
Eisler Engineering Co., Newark, N. J.
Kilmer, M. D., & Co., Cleveland, Ohio

MACHINERY—Wire Drawing
Aetna-Standard Engineering Co., Pittsburgh, Pa.
Cook Manufacturing Co., The, Paterson, N. J.
Herborn, Herborn, Germany
Morgan Construction Co., Worcester, Mass.
National Mach'y Exch. (Used), New York, N. Y.
Scudder, E. J., Fdry. & Mach. Co., Trenton, N. J.
Sleeper & Hartley, Inc., Worcester, Mass.
Steel Equipment Co., Cleveland, Ohio
Syncro Machine Co., Perth Amboy, N. J.
Vaughn Machinery Co., Cuyahoga Falls, O.
Waterbury-Farrel Foundry & Machine Co., Waterbury, Conn.
Wean Equipment Corp., Cleveland, Ohio

MACHINERY—Wire Forming
Baird Machine Co., The, Stratford, Conn.
Cosa Corporation, New York, N. Y.
Kilmer, M. D., & Co., Cleveland, Ohio
National Mach'y Exch. (Used), New York, N. Y.
Sleeper & Hartley, Inc., Worcester, Mass.

MACHINERY—Wire Rope
Milton Machine Works, Inc., Milton, Pa.
New England Butt Co., Providence, R. I.
Niehaus, K. A., Maschinenfabrik, Dusseldorf-Rath, Germany
Watson Machine Co., Paterson, N. J.

MACHINERY—Wrapping with Paper
Terkelsen Machine Co., Boston, Mass.

MATERIAL HANDLING EQUIPMENT—
Cleveland Tramrail Div. of The Cleveland Crane & Engineering Co., Wickliffe, O.

MILLS—Tandem, Rolling & Edging
Wean Equipment Co., Cleveland, Ohio

NAIL TOOLING—Tungsten Carbide
Firth Sterling, Inc., Pittsburgh, Pa.
Pittsburgh Carbide Die Co., Monongahela, Pa.

NAILS—Wire
Bethlehem Steel Co., Bethlehem, Pa.
Continental Steel Corp., Kokomo, Ind.
Keystone Steel & Wire Co., Peoria, Ill.
Wickwire Brothers, Inc., Cortland, N. Y.

NOZZLES—For Extruding Machines
Wire Tool Div., Bridgeport Jig Boring Co., Bridgeport, Conn.

OVENS—Cable Lacquering
American Insulating Mach'y Co., Phila., Pa.
Carl-Mayer Corp., The, Cleveland, Ohio.
Industrial Ovens, Inc., Cleveland, Ohio
Morrison, John R., Industries, Inc., Cleveland, Ohio
Rockwell Co., W. S., Fairfield, Conn.

OVENS—Rod Bakers
Carl-Mayer Corp., The, Cleveland, Ohio
Morrison, John R., Industries, Inc., Cleveland, Ohio

OVENS—Welding Rod Coating
Carl-Mayer Corp., The, Cleveland, Ohio
Industrial Ovens, Inc., Cleveland, Ohio
Morrison, John R., Industries, Inc., Cleveland, Ohio

PAINT—Acid Proof
Ceilcote Company, Cleveland, Ohio

PAINT BONDING CHEMICALS—
American Chemical Paint Co., Ambler, Pa.

PAINTS—Heat Resisting
American Chemical Paint Co., Ambler, Pa.

PAPER—Creped Wrapping
National Waterproof Papers, Inc., Camden, N. J.
Terkelsen Machine Co., Boston, Mass.

PAPER—For Coil Wrapping and Corrosion Prevention
National Waterproof Papers, Inc., Camden, N. J.
Terkelsen Machine Co., Boston, Mass.

PATENT ATTORNEYS—
Lancaster, Allwine & Rommel, Washington, D. C.

PAY-OUT SYSTEMS—(See MACHINERY—Take-Up & Pay-Out)

PHOSPHATE COATING CHEMICALS — (See COMPOUNDS — Phosphate Coating)

PICKLING COMPOUNDS—
See (Inhibitors—Pickling)

PICKLING—Hooks, etc. Acid Resisting
Youngstown Welding & Eng'g Co., Youngstown, Ohio.

PICKLING TANK LININGS—
Chemsteel Construction Co., Pittsburgh, Pa.
Haveg Corp., Newark, Del.
Heil Process Equipment Corp., Cleveland, Ohio

PIPES & FITTINGS—Acid Resistant
Haveg Corp., Newark, Del.

PLASTICS—for Wire Insulation
Naugatuck Chemical Division of United States Rubber, Naugatuck, Conn.

POTS—Lacquer
Industrial Ovens, Inc., Cleveland, Ohio

PRESSES—Hydraulic and Mechanical
Aetna-Standard Engineering Co., Pittsburgh, Pa.

PULLERS AND GRIPS—For Wire
Morgan Construction Co., Worcester, Mass.
Scudder, E. J. Fdry & Mach. Co., Trenton, N. J.
Sjogren Tool and Machine Co., Auburn, Mass.
Sleeper & Hartley, Inc., Worcester, Mass.
Vaughn Machinery Co., Cuyahoga Falls, O.
Wean Equipment Corp., Cleveland, Ohio

REEL AND TENSION STANDS—
Davis Electric Co., Wallingford, Conn.
Entwistle, Jas. L. Co., Providence, R. I.
Fidelity Machine Company, Inc., Philadelphia.
Industrial Ovens, Inc., Cleveland, Ohio
Kilmer, M. D., & Co., Cleveland, Ohio
Moslo Machinery Co., Cleveland, Ohio
New York Engineering Co., Yonkers, N. Y.
Roll-A-Reel, Cincinnati, Ohio
Sleeper & Hartley, Inc., Worcester, Mass.
Standard Mill Supply Co., Pawtucket, R. I
Syncro Machine Co., Perth Amboy, N. J.
Watson Machine Co., Paterson, N. J.
Wire Insulating Machy., Div. of Machinery Electrification, Inc., Worcester, Mass.

REEL CRUTCHES—
Roll-A-Reel, Cincinnati, Ohio
Watson Machine Co., Paterson, N. J.

REELS & SPOOLS—Aluminum Alloy
Acrometal Products, Inc., Minneapolis, Minn.
Hubbard Spool Co., Garrett, Ind.
Milton Machine Works, Inc., Milton, Pa.

REELS & SPOOLS—Annealing and Stranding
Acrometal Products, Inc., Minneapolis, Minn.
Apco Mossberg Co., Attleboro, Mass.
Howsam Spool Co., Aurora, Ill.
Hubbard Spool Co., Garrett, Ind.
Milton Machine Works, Inc., Milton, Pa.
Mossberg Pressed Steel Corp., Attleboro, Mass.
Republic Steel Corp., Pressed Steel Div., Niles, Ohio

REELS—Metal Bound
Durkee Mfg. Co., Pine River, Minn.
Howsam Spool Co., Aurora, Ill.
Hubbard Spool Co., Garrett, Ind.
McCaskie, Inc., Wm., Westport, Mass.

REELS—Plywood
Carris Reels, Inc., Rutland, Vt.
Hubbard Spool Co., Garrett, Ind.
McCaskie, Inc., Wm., Westport, Mass.
Nelson Company, The, Baltimore, Md.
Winchester Reel Co., Ashuelot, N. H.

REELS & SPOOLS—Steel (All Types)
Acrometal Products, Inc., Minneapolis, Minn.
Apco Mossberg Co., Attleboro, Mass.
Clark, J. L. Mfg. Co., Rockford, Ill.
Howsam Spool Co., Aurora, Ill.

WHERE TO BUY, Continued

For more complete information, consult the annual Wire and Wire Products Buyers' Guide.

Hubbard Spool Co., Garrett, Ind.
Mason Can Company, East Providence, R. I.
Milton Machine Works, Inc., Milton, Pa.
Mossberg Pressed Steel Corp., Attleboro, Mass.
New York Engineering Co., Yonkers, N. Y.
Republic Steel Corp., Pressed Steel Div., Niles, Ohio

REELS—Wire Mill
Acrometal Products, Inc., Minneapolis, Minn.
Apco Mossberg Co., Attleboro, Mass.
Bridge Mfg. Co., The, Hazardville, Conn.
Carris Reels, Inc., Rutland, Vt.
Durkee Mfg. Co., Pine River, Minn.
Howsam Spool Co., Aurora, Ill.
Hubbard Spool Co., Garre't, Ind.
Mason Can Company, East Providence, R. I.
McCaskie, Inc., Wm., Westport, Mass.
Mettler Machine Tool, Inc., New Haven, Conn.
Milton Machine Works, Inc., Milton, Pa.
Moslo Machinery Co., Cleveland, Ohio.
Mossberg Pressed Steel Corp., Attleboro, Mass.
New York Engineering Co., Yonkers, N. Y.
Republic Steel Corp., Pressed Steel Div., Niles, Ohio
Winchester Reel Co., Ashuelot, N. H.

REELS & SPOOLS—Wooden
American Woodworking Co., Chicago, Ill.
Bridge Mfg. Co., Inc., The, Hazardville, Conn.
Carris Reels, Inc., Rutland, Vt.
Durkee Mfg. Co., Pine River Minn.
Hubbard Spool Co., Garrett, Ind.
Nelson Company, The, Baltimore, Md.
Winchester Reel Co., Ashuelot, N. H.

REFRACTORIES—High Temperature
Norton Company, Worcester, Mass.

ROD BAKERS—(See Ovens—Rod Bakers)

RODS—Stainless Steel
American Steel & Wire Co., Cleveland, Ohio
Crucible Steel Co. of America, Pittsburgh, Pa.
Pittsburgh Steel Co., Pittsburgh, Pa.

RODS—Wire—Non-Ferrous
Platt Bros. & Co., The, Waterbury, Conn.

RODS—Wire, Steel
Bethlehem Steel Co., Bethlehem, Pa.
Colorado Fuel and Iron Corporation, Pacific Coast Division, Oakland, Calif.
Continental Steel Corp., Kokomo, Indiana.
Crucible Steel Co. of America, Pittsburgh, Pa.
Jones & Laughlin Steel Corp., Pittsburgh, Pa.
Keystone Steel & Wire Co., Peoria, Ill.
Pittsburgh Steel Company, Pittsburgh, Pa.
Youngstown Sheet & Tube Co., Youngstown, O.

ROPE—Wire
American Steel & Wire Company, Cleveland, O.
Bethlehem Steel Co., Bethlehem, Pa.
Jones & Laughlin Steel Corp., Pittsburgh, Pa.
Roebling's, John A. Sons Corp., Trenton, N. J.

RUBBERS—for Wire Insulation
Naugatuck Chemical Division of United States Rubber, Naugatuck, Conn.

RUST PROOF COMPOUNDS—
(See Compounds—Rust Preventing)

RUST REMOVING COMPOUNDS—
(See Compounds—Rust Preventing)

SALTS—Heat Treating, Descaling, etc.
Holden, A. F., Co., The, Detroit, Mich.

SATURATION SYSTEMS—
Industrial Ovens, Inc., Cleveland, Ohio
New York Engineering Co., Yonkers, N. Y.
Watson Machine Co., Paterson, N. J.
Wire & Textile Mach'y, Inc. (used) Pawtucket, R. I.

SOAPS—Industrial and Wire Drawing
(See Compounds—Wire Drawing)

SODIUM—for Descaling
du Pont de Nemours & Co., Inc., E. I., Wilmington, Del.
Holden, A. F., Co., The, Detroit, Mich.

SPOOLS—(See Reels & Spools)

SPOOLS—Stamped Metal for Retail Wire Sales
Clark, J. L. Mfg. Co., Rockford, Ill.
Mason Can Co., East Providence, R. I.

STAMPINGS—Steel
Acrometal Products, Inc., Minneapolis, Minn.
Mossberg Pressed Steel Corp., Attleboro, Mass.

STRIP—Steel
Bethlehem Steel Co., Bethlehem, Pa.
Continental Steel Corp., Kokomo, Ind.
Roebling's, John A. Sons Corp., Trenton, N. J.
Youngstown Sheet & Tube Co., Youngstown, O.

TANKS—Compound
New York Engineering Co., Yonkers, N. Y.
Watson Machine Co., Paterson, N. J.

TANKS—Pickling and Plating
Ceilcote Company, Cleveland, Ohio
Chemsteel Construction Co., Pittsburgh, Pa.

TESTERS — INSULATION (See MACHINERY—Spark Testers)

TESTING EQUIPMENT (See MACHINERY Testing, Physical and Diameter Testing)

TESTING EQUIPMENT—Springs
Spring Mfgs. Supply Co., Plantsville, Conn.

TINNING PROCESS—
Metal & Thermit Corp., New York, N. Y.

TINSEL—Electric Conductor
Montgomery Co., The Windsor Locks, Conn.

TINSEL WIRE—Resistance, Lame, Decorative Cords Thread—Bare Copper, Silver and False Gold Coated, etc. (See TINSEL—Electric Conductor)

TOOLS—Nail Machine
Pittsburgh Carbide Die Co., Monongahela, Pa.

TOOLS—Spring Forming
Lundahl Corp., Winsted, Conn.
Spring Mfgs. Supply Co., Plantsville, Conn.

TOOLS—Wire Cutting
Porter, H. K. Inc., Somerville, Mass.

TRAMRAIL SYSTEMS—
Cleveland Tramrail Div. of the Cleveland Crane & Engineering Co., Wickliffe, O.

TRANSMISSIONS—Variable speed (See Machy—Power Transmission)

TRAVERSES & DRUMS—For Reels
(See Drums & Traverses)

TRAVERSE MECHANISMS—
Apco Mossberg Co., Attleboro, Mass.
New England Butt Co., Providence, R. I.
Watson Machine Co., Paterson, N. J.
Wire & Textile Mach'y, Inc. (used) Pawtucket, R. I.
Wire Insulating Machy., Div. of Machinery Electrification, Inc., Worcester, Mass.

TUBE BENDERS AND FORMERS—
Kilmer, M. D., & Co., Cleveland, Ohio

VALVES & FITTINGS—Acid Resistant
Haveg Corp., Newark, Del.

VARNISHES—for Electric Wire
N. E. Lacquer Co., E. Providence, R. I.

VULCANIZING PANS AND EQUIPMENT—
American Insulating Mach'y Co., Phila., Pa.
Mossberg Pressed Steel Corp., Attleboro, Mass.
Wire Insulating Machy., Div. of Machinery Electrification, Inc., Worcester, Mass.

WELDERS—Spot and Butt
Eisler Engineering Co., Newark, N. J.
Micro Products Co., Chicago, Ill.

WIRE—Aluminum
Elmet Division, North American Philips Company, Inc., Lewiston, Maine
Malin & Co., The, Cleveland, Ohio
Seneca Wire & Manufacturing Co., Fostoria, O.

WIRE—Barbed
Interlocking Fence Co., Morton, Ill.

WIRE—Brass
Chase Brass & Copper Co., Waterbury, Conn.
Spencer Wire Corp., Union, N. J.

WIRE—Brush
Spencer Wire Corp., Union, N. J.

WIRE—Cast
Youngstown Sheet & Tube Co., Youngstown, O.

WIRE—Cold Heading
American Steel & Wire Co., Cleveland, Ohio
Bethlehem Steel Co., Bethlehem, Pa.
Colorado Fuel and Iron Corporation, Pacific Coast Division, Oakland, Calif.
Continental Steel Corp., Kokomo, Ind
Crucible Steel Co. of America, Pittsburgh, Pa.
Keystone Steel & Wire Co., Peoria, Ill.
Pittsburgh Steel Co., Pittsburgh, Pa.
Seneca Wire & Manufacturing Co., Fostoria, O.
Wickwire Steel Div., The Colorado Fuel & Iron Corp., New York, N. Y.
Youngstown Sheet & Tube Co., Youngstown, O.

WIRE—Copper
Chase Brass & Copper Co., Waterbury, Conn.
Spencer Wire Corp., Union, N. J.

WIRE—Flat, Fine
Elmet Division, North American Philips Company, Inc., Lewiston, Maine
Montgomery Co., The, Windsor Locks, Conn.

WIRE—Forming
Pittsburgh Cut Wire Co., Pittsburgh, Pa.

WIRE—Galvanized
Colorado Fuel and Iron Corporation, Pacific Coast Division, Oakland, Calif.
Jones & Laughlin Steel Corp., Pittsburgh, Pa.
Roebling's, John A. Sons Corp., Trenton, N. J.
Wickwire Steel Div., Colorado Fuel & Iron Corp., New York, N. Y.

WIRE—Manufacturers
American Steel & Wire Co., Cleveland, Ohio
Bethlehem Steel Co., Bethlehem, Pa.
Chase Brass & Copper Co., Waterbury, Conn.
Continental Steel Corp., Kokomo, Ind.
Colorado Fuel and Iron Corporation, Pacific Coast Division, Oakland, Calif.
Crucible Steel Co. of America, Pittsburgh, Pa.
Johnson Steel & Wire Co., Worcester, Mass.
Jones & Laughlin Steel Corp., Pittsburgh, Pa.
Keystone Steel & Wire Co., Peoria, Ill.
National Lock Washer Company, The, Newark, N. J.
North American Philips Co., Inc., Elmet Division, Lewiston, Me.
Pittsburgh Steel Co., Pittsburgh, Pa.
Roebling's, John A., Sons Corp., Trenton, N. J.
Seneca Wire & Manufacturing Co., Fostoria, O.
Spencer Wire Corp., Union, N. J.
U. S. Steel Co., N. Y., N. Y.
Wickwire Brothers, Inc., Cortland, N. Y.
Wickwire Steel Div., Colorado Fuel & Iron Corp., New York, N. Y.
Youngstown Sheet & Tube Co., Youngstown, O.

WIRE—Music
American Steel & Wire Co., Cleveland, Ohio
Johnson Steel & Wire Co., Inc., Worcester, Mass.
Malin & Co., The, Cleveland, Ohio
Seneca Wire & Manufacturing Co., Fostoria, O.
Spencer Wire Corp., Union, N. J.

WIRE—Nickel Silver and Phosphor Bronze
Chase Brass & Copper Co., Waterbury, Conn.
Jones & Laughlin Steel Corp., Pittsburgh, Pa.
Malin & Co., The, Cleveland, Ohio

WIRE—Oil Tempered
Crucible Steel Co. of America, Pittsburgh, Pa.
Pittsburgh Steel Co., Pittsburgh, Pa.
Roebling's, John A., Sons Corp., Trenton, N. J.

WIRE—Special Shapes
Charter Wire, Inc., Milwaukee, Wisc.
Crucible Steel Co. of America, Pittsburgh, Pa.
Continental Steel Corp., Kokomo, Ind.
National Lock Washer Company, The, Newark, N. J.

WIRE—Spring
Bethlehem Steel Co., Bethlehem, Pa.
Colorado Fuel and Iron Corporation, Pacific Coast Division, Oakland, Calif.
Continental Steel Corp., Kokomo, Ind.
Crucible Steel Co. of America, Pittsburgh, Pa.
Johnson Steel & Wire Co., Inc., Worcester.
Jones & Laughlin Steel Corp., Pittsburgh, Pa.
Keystone Steel & Wire Co., Peoria, Ill.
Pittsburgh Steel Co., Pittsburgh, Pa.
Roebling's, John A., Sons Corp., Trenton, N. J.
Seneca Wire & Mfg. Co., Fostoria, Ohio
Wickwire Steel Div., Colorado Fuel & Iron Corp., New York, N. Y.
Youngstown Sheet & Tube Co., Youngstown, O.

WIRE—Stainless Steel
American Steel & Wire Co., Cleveland, Ohio
Crucible Steel Co. of America, Pittsburgh, Pa.
Firth Sterling, Inc., Pittsburgh, Pa.
National Lock Washer Company, The, Newark, N. J.
Pittsburgh Steel Co., Pittsburgh, Pa.

WIRE—Steel—Also Coppered and Galvanized Steel
Bethlehem Steel Co., Bethlehem, Pa.
Continental Steel Corp., Kokomo, Ind.
Colorado Fuel and Iron Corporation, Pacific Coast Division, Oakland, Calif.
Crucible Steel Co. of America, Pittsburgh, Pa.
Johnson Steel & Wire Co., Inc., Worcester, Mass.
Jones & Laughlin Steel Corp., Pittsburgh, Pa.
Keystone Steel & Wire Co., Peoria, Ill.
Pittsburgh Steel Co., Pittsburgh, Pa.
Roebling's, John A., Sons Corp., Trenton, N. J.
Seneca Wire & Mfg. Co., Fostoria, Ohio
Spencer Wire Corp., Union, N. J.
U. S. Steel Export Co., New York, N. Y.
Wickwire Brothers, Inc., Cortland, N. Y.
Wickwire Steel Div., Colorado Fuel & Iron Corp., New York, N. Y.
Youngstown Sheet & Tube Co., Youngstown, O

WIRE—Straightening and Cutting
Colorado Fuel and Iron Corporation, Pacific Coast Division, Oakland, Calif.
Wickwire Brothers, Inc., Cortland, N. Y.
Wickwire Steel Div., Colorado Fuel & Iron Corp., New York, N. Y.

WIRE—Tungsten
North American Philips Co., Inc., Elmet Division, Lewiston, Me.

WIRE—Zinc
Platt Bros. & Co., The, Waterbury, Conn.

WRAPPING PAPER—Creped (See PAPER—Creped Wrapping)

YARNS & TAPES—
Celanese Corporation of America, New York, N. Y.
Glass Fibers, Inc., Toledo, Ohio
Heineman Corp., Oscar, Chicago, Ill.

YARN TESTERS—
Scott Testers, Inc., Providence, R. I.

The WATSON MACHINE COMPANY

ESTABLISHED 1845

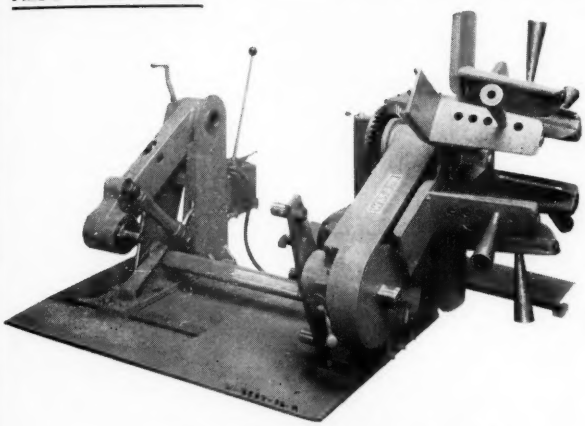
PATERSON 3, NEW JERSEY, U. S. A.

ELECTRICAL WIRE AND CABLE, WIRE ROPE, CORDAGE AND MASTICATING MACHINERY MANUFACTURERS

WATSON

REWINDERS AND COILERS

THESE UNITS, DESIGNED FOR HEAVIEST DUTIES, ARE THE PREFERRED STANDARD IN CORDAGE, CABLE AND WIRE ROPE SHIPPING ROOMS AND WAREHOUSES. THEY ARE SELF-POWERED AND EQUIPPED WITH MULTI-SPEED SLIDE GEAR TRANSMISSIONS. FOOT TREADLE CONTROLS SMOOTH ACCELERATION AND ADJUSTABLE AUTOMATIC BRAKE CONTROLS COASTING. COILING HEADS ARE OPTIONAL AND REMOVABLE. ILLUSTRATIONS SHOW MOST POPULAR MODELS, BUT OTHERS RANGING FROM 16" TO 120" SIZES ARE ALSO AVAILABLE.



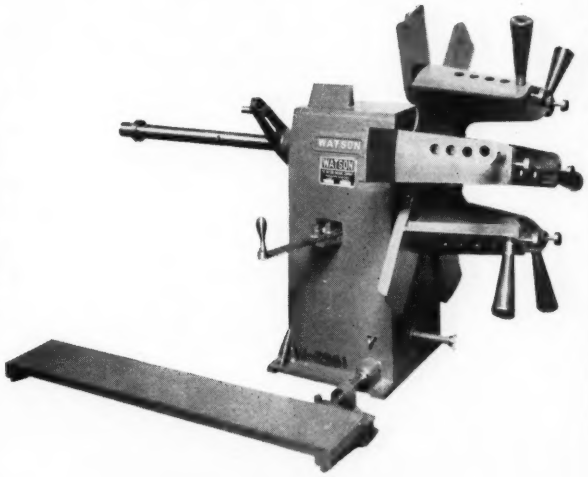
"SHAFTLESS" TYPE "H"

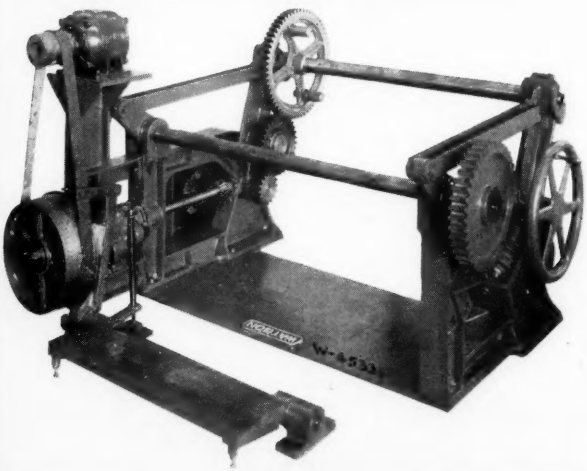
U. S. Patent No. 2,624,522

BUILT IN 50"-3 TON AND 72"-6 TON SIZES. SIX SPEED DRIVE. REEL DRIVE ALWAYS IN MESH REGARDLESS OF POSITION AND REQUIRES MERELY FLOOR CLEARANCE FOR REEL ROTATION. OUTSTANDING FEATURES ARE *SAFETY* DUE TO REEL SHAFT ABSENCE, WITH *RAPIDITY* AND *EASE* OF REEL MANIPULATION. 50" SIZE UNIT SHOWN WITH A 24" ADJUSTABLE WIDTH, HEAVY DUTY COILING HEAD IN POSITION.

"FIXED SHAFT" TYPE "RC-54"

THIS LOW COST BALL-BEARING MODEL REQUIRES A HOIST FOR REEL LOADING. IT HAS THREE SPEEDS AND BUILT-IN MOTOR. RECEIVES REELS TO 54" FLANGE DIA.. LOAD LIMIT IS REACHED WITH STD. 2-5/16" DIA. SHAFT WHEN REEL WEIGHT IN POUNDS MULTIPLIED BY REEL WIDTH IN INCHES DOES NOT EXCEED 75,000 IN. LBS.. OPTIONAL COILING HEAD SHOWN IN POSITION. REEL SHAFT MAY EXTEND ON BOTH SIDES.





"MECHANICAL LIFT" TYPE "W"

U. S. Patent No. 1,867,688

AVAILABLE IN ALL SIZES TO 84"-6 TON MAXIMUM. THE UNIT SHOWN IS A 60"-4 TON UNIT, WITH GUARD REMOVED TO SHOW INPUT DRIVE. FREELY ACTING BALL-BEARING WORM-WHEEL LIFT. FLOOR CLEARANCE ONLY IS REQUIRED FOR REEL ROTATION. FIVE SPEEDS. REEL SHAFT MAY BE EXTENDED TO MOUNT COILING HEAD.

3-54

EF

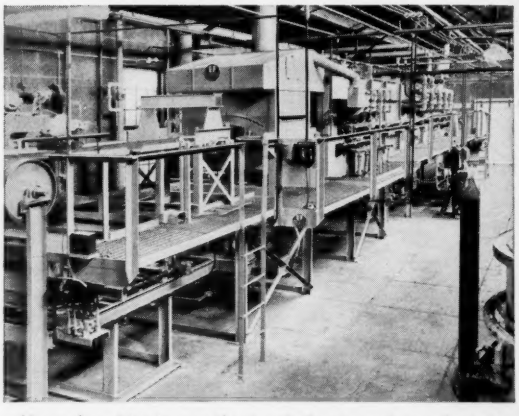
RESEARCH DEPARTMENT

available to

PRODUCERS and PROCESSORS

of metals and metal products

General view of the research department showing several of the continuous and batch type experimental furnaces.

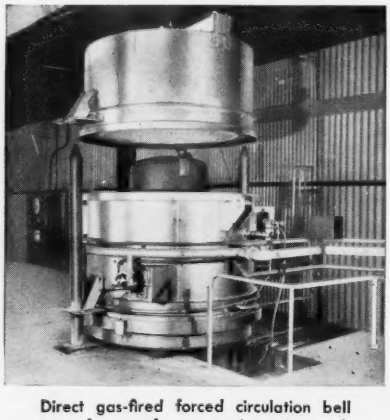


View of combination gas-fired and electric continuous furnace equipped with flame preheating burn-off or oxidizing section and controlled heating, soaking and cooling zones, for producing various surface conditions on strip.

● The EF research department is equipped with gas-fired, oil-fired and electrically heated continuous and batch units including,— continuous wire mesh furnaces;— endothermic and exothermic special atmosphere generators; — forced circulation bell furnaces; — a continuous roller hearth furnace for treating commercial widths of ferrous and non-ferrous strip; — and other equipment.

Consequently, — from test runs — we can determine accurately the combination of temperature, time cycle, atmosphere and other factors needed to produce the exactly desired result,— assuring — in advance — the efficient performance of EF furnaces *fully up to specification.*

Many large companies have drawn liberally upon this department in developing new products, and new techniques. Our facilities are available to YOU also — for YOUR research or development work, either gratis or for a moderate fee, depending upon the nature of the experiment. We will be glad to schedule time for your technicians, or write today for our 12 page booklet, "Research Facilities". It describes the equipment we can place at your disposal.



Direct gas-fired forced circulation bell type furnace for processing wire, rod, strip and other products.

Gas-Fired, Oil-Fired EF ***and Electric Furnaces***

for any Process, Product or Production

THE ELECTRIC FURNACE CO.

WILSON ST. at PENNA. R. R. *Salem - Ohio*

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